40 Rock

POPULAR Computing WEEKLY

Only 40p.

20-26 September 1984

It's the best selling weekly

Vol 3 No 38

Acorn's new ABC micro



ACORN this week launches its range of business computers — called the ABC range

The machines are based around a development of the BBC machine with 6502 core processor offered with a choice of second-processor options beginning with a Z80 — giving CP/M compatibility — and including the 16/32 bit National Semiconductor 16032 — offering the Xenix operating system — and at the top end the 80286 16/24 bit development from the 8086 giving the ABC range IBM compatibility

All have full size keyboard, discs and monitor

At the bottom end of the range is the Terminal — broadly a BBC machine with Econet, terminal-emulator software, 32K Ram and a 14 inch black-and-white monitor.

Next is the Personal Assistant wordprocessor with one double-density 5.25 inch disc drive with up to 700K storage capacity. It is fully expandable to the top of the range machine.

The first of the ABC machines with the second processor options is the ABC 100 with two 700K drives and a Z80 second processor, which runs CP/M. Like the Personal Assistant it has a 12 inch black-and white monitor

The second, the ABC110, has a colour monitor one 700K disc drive and a 10M Winchester hard disc

The next two models, the ABC 200 and 210, use the 32016 16/32 bit chip and have 256K Ram. The 210 uses the Xenix operating system.

Finally, the ABC 300 and 310 machines use the Intel 80286 chip, a development from the 8086 and 8088 processor range, which gives the machines IBM compatibility running Digital Research Concurrent version 3.1 with 256K Ram, upgradable to 1M. Other specifications are similar to that of the 100 and 110 respectively.

The range is being previewed at the Personal Computer World Show, but will not be available until early 1985

continued on page 5 ▶

Oric's new Stratos

ORIC'S Cambridge based research team is working on the successor to the Atmos which will be launched in France, before the end of the year

The new micro — with the working name of the Stratos — will be technically very similar to the Atmos and be based around the 6502 processor chip

Commented Tansoft's marketing manager Adrian Rushmore "We will be providing software support for it. We do not have to adapt our existing titles for the new machine — it is software compatible with the Oric1 and Atmos machines."

Oric has been more successful in the rest of Europe than in the UK and is the market leader in France where the new machine is to be launched.

Enterprise slips again

THE arrival of the long-awaited 64K Enterprise computer seems likely to have been delayed yet again.

Retailers have yet to be given firm delivery dates for Christmas and Prism, the machine's main distributor, has been told not to expect first machines until 1985

Continued on page 5 ▶

WIN £25,000 AND SAVE THE WORLD

Eureka!

250 K OF PURE MYSTERY BY IAN LIVINGSTONE

■ Epic in sheer size — there's more than 250K

Specium 48K or Commodore 64 (Turboload)

Full colour booklet packed with cryptic clues to help you unravel the mystery — and win the £25 000 reward

Music and sound effects built in

5 PROGRAMS IN ONE

■ All 5 Adventures are linked — but you can ... them separately. And they all have REAL TIME built in. So if you don't think fast you wind up as a pterodactyl's lunch, die of over-exertion in a Roman orgy, or just lose your mind.

■ "Eureka!" is not just an Epic — not just an Adventure. At the start of each historical era you face an Arcade Action test to decide your strength level for the Adventure to come.

■ The better your score the stronger and faster you'll be.

■ And it'll keep you on your toes with constantly changing, static and moving graphics. Brilliant music and sound effects add to the excitement.

■ As part of the "Eureka!" pack, you receive a full colour illustrated booklet containing cryptic riddles and mysterious illustrations. Using booklet and screen *together* you steadily unravel the clues and build up a secret phone number piece by piece.

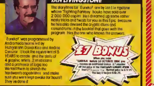
■ If you're first to ring it you save the world and collect the £25 000!

■ Quite a package! And to give everyone a fair chance "Eureka!" will be released simultaneously worldwide on October 31st 1984. No packs will be available until that date. All orders received by mail or phone by 26th OCTOBER will be despatched by post on the 31st right across the world. So order now, and be one of the first off the mark.

High quality, full colour static and moving graphics

Just clip the coupon. Or, for ... order by Credit Card on the "Eureka!" Telephone Hotline 01 460 ...

THEN THE RACE IS ON!!!



Domark Ltd. 228 Munster Road, London SW6. Reg. No. 1804186 (England).

Eureka!



POPULAR Computing WEEKLY



) View

There is a small squabble taking place in the *Popular* offices this week.

The subject of the mild wrangle is the ownership of a small yellow plastic bucket and green spade which arrived by post two weeks ago.

They are both a gift from the UK MSX working group and the first indication of the quantity of money, time and effort that the world's top electronics companies intend to spend to ensure that MSX will become a household word and will be hugely successful — regardless of the technical merit or otherwise of the system.

On Wednesday a selected group of microcomputer journalists — instead of attending the trade and press day of this year's Personal Computer World Show — will be clutching their buckets and spades on a day trip to the south of France — Juan-Les-Pins to be precise.

For it is here in the Cote d'Azur — on the opening day of the Personal Computer World Show in London — that the MSX machines are to be officially launched. The hope no doubt is to detract attention from the UK micro companies which, together with Commodore, will be showing new machines at the show.

More than that, the trip serves to underline the scale of the promotional effort that will be going to ensure that there are no hiccups and that MSX achieves for the Japanese manufacturers their stated intention of becoming 'the first home computer standard.

With all the Sunday supplement ads, the poster hoardings, national press and television promotion, it will be easy to forget what MSX is about.

It will be easy to forget that MSX is Z80, that MSX is 8-bit, that MSX is somewhat overpriced and that MSX isn't really anything new.

) Presents...

) Futures...

How to get things working on the Amstrad . . . Expand your attributes on the Spectrum . . . Error recovery on the 64

Editor David Kelly **News editor** Christina Erskine **Features editor** Graham Taylor **Software editor** John Cook **Production editor** Lynne Constable **Editorial secretary** Geraldine Smyth **Advertisement manager** David Lake **Assistant advertisement manager** Alastair Macintosh **Advertisement executive** Tom Watson **Classified executive** Diane Davis **Advertising production** Lucinda Lee **Administration** Theresa Lacy **Managing editor** Duncan Scot **Publishing director** Jenny Ireland

Published by Sunshine Publications Ltd 12 13 Little Newport Street London WC2H 3LD Tel 01-437 4343 Telex 296275 **Typeset by** The Artwork Group 55-63 Goswell Road London EC1 in association with Ink on Paper Ltd **Printed by** East Midland Litho Printers Ltd Oundle Road Woodston Peterborough PE2 9QR **Distributed by** S M Distribution London SW9 tel 01 274 8611 telex 261643 © Sunshine Publications Ltd 1984

How to submit articles Articles which are submitted for publication should not be more than 2000 words long. The articles and any accompanying programs should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted. **Accuracy** *Popular Computing Weekly* cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

Computer Trade Association Magazine of the Year

Enterprise

◂continued from page 1

The further delay to the machine — which has been dogged by problems since it was first due in the shops almost a year ago — appears to have been caused by design difficulties with the machine's so-called 'Nick' video chip.

"We hope to be out this autumn but we want to make sure that the product is fully debugged first," said Caroline Jones of Enterprise's marketing department. "At the moment we cannot say how many machines will be available this Christmas."

Caroline continued, "Prism will be distributing the Enterprise through its 700 outlets, we will also be selling through John Menzies, and Boots and W H Smith's have expressed an interest for 1985

John Menzies' computer product manager Scott Coghill confirmed that John Menzies were in negotiations with Enterprise, but added, "As yet, we have been given no firm date for delivery."

And John Flatman, Boots computer buyer said, "It is possible we may take the Enterprise in 1985, but to do so, we would have to drop a machine already in stock, and I cannot think which one it would be."

Bob Denton, managing director of Prism said, "We have now been told that our first supplies of the Enterprise will not be until January — until recently we understood the first machines were due this month."

Enterprise's 128K model has been even further delayed and first machines are now not expected until first quarter next year.

Spectravideo release

SPECTRAVIDEO is releasing a new MSX machine, the 728. It is fully MSX compatible and costs £249 95 retail. Spectravideo hopes to start shipping in October. It includes 80K Ram which breaks down to 64K Ram and 16K video Ram. It has 90 keys of which 10 are user programmable, and has a numeric key pad resolution of 256×193 pixels.

Launch of Compunet

COMPUNET, Commodore's own Prestel type interactive database system is officially launched this week.

Initially the service will be available only to Commodore 64 and SX64 owners. To access the system it will be necessary to buy the Commodore modem—which plugs into the 64's cartridge port and connects to a standard British Telecom telephone socket allowing the micro to communicate the Compunet's main frame computer.

The modem unit costs £99 99 and the price includes one year's free subscription to Compunet. Thereafter Compunet subscribers will have to pay an annual fee of around £30

Connection to Compunet will be free between 6pm and 8am and subscribers will be able both up and down-load information and use its electronic mail and teleshopping facilities—the latter available by joining Comp-U-Card, an on-line discount shopping scheme Discounted commercial software will also be offered for down-loading By the time the system is fully operational in mid October, around 50 software packages will be available, including *Punchy* from Mr Micro and *Little Icarus*, *International Soccer Humphrey* and *Pandora's Box* from Commodore.

The Compunet modem is a 1200/75 baud V23 full-duplex asynchronous device Compunet operates at 1200/75 baud full-duplex with a 1200/1200 half-duplex up-load facility

With 12 access points (nodes) distributed nationally, most subscribers should be able to access the system at local call rates

Owners of the Commodore modem will not be restricted to Compunet, however The device is also compatible with Prestel and Micronet—both of which can be accessed on payment of the relevant subscription, and the modem, within its 8K Rom, has a soft-load option direct communication from one Commodore 64 to another

Dragons from Compusense

CUT PRICE Dragon computers should shortly be available through Compusense

The company aims to sell both the 32K and 64K models in bundled packages—the 32 with a single disc drive and software and the 64 with a double disc drive and software

"The package with the 32K model will cost around £380, and the 64K set for about £460," said Ted Opyrchal, managing director of Compusense "We are also planning to exchange Dragon 32s—in working condition, of course—for the 64K plus the disc drive at £60 off, about £400–£410 The used 32s we will then donate to Local Education Authorities

"This has come about because GEC has large stocks of the hardware at the moment, and Touchmaster a lot of software. The software includes programs such as OS9 and the *Flex Editor/Assembler*, which we would be offering."

This offer should be available within the next week and will apply only while stocks last.

Details from Compusense, Green Lanes, London N13

Your personal banker

KENT-based Hilton Computer Services is taking a gamble with its *Personal Banking System*.

Hilton to become the first UK home computer software company to distribute a program as Freeware.

Freeware is a form of distribution that gets round the problem of piracy in one fell swoop The program is distributed by mail-order free of charge to those interested, who then send a voluntary contribution to the company.

In Hilton's case, the donation then entitles the user to after-sales support, and up-graded versions of the *Personal Banking System*.

"I know we're taking a risk, and we could well be ripped off," said Jack Gibbons, Hilton's managing director "Certainly if we were offering games, then I don't think people would pay but this is a service program, with a limited market, and I think it could work

"We're making no guidelines as to how much people should donate—after all, if we told them its normal price, they may use that as an upper limit."

Personal Banking System is available for ZX81 (16K), 48K Spectrum (Microdrive compatible), BBC and Dragon (32 and 64K) Details from Hilton Computer Services, 14 Avalon Road, Orpington, Kent.

Norman's on the warpath

QUICKSILVA plans a strong line of products for the Autumn.

Dungeons of Ba and *Castle of Jasoon*—both on disc for the C64 at £14 95 from the Canadian house Accellerated Software are what Quicksilva describes as "interactive films"—arcade adventures, featuring Norman the Warrior

Another disc product for the 64 is *Summer Games* by Epyx; priced at £19 99 (also available on two cassettes for £14 95).

After a tie-up with the UK comic *2000AD* Quicksilva has two titles featuring Strontium the Dog—*Strontium the Dog—the Killing* for the Spectrum (£6 97) and *Strontium Dog and the Death Gauntlet* for the 64 (£7 95)

The follow up to *3D Ant Attack* on the Spectrum is *Zombie, Zombie* which includes MIDI sound Software, while *3D Ant Attack* is released for the 64

Finally there is *Eric Bristow's Pro-Darts* and *Blood and Guts* for the Spectrum where you travel through the organs of the body "all in the best possible taste", both for the Spectrum.

Salamander SOFTWARE DISCOUNT CLUB

FREE STICKERS

FREE MEMBERSHIP

FREE T SHIRTS

Dear Dragon Owner,

Are you feeling left in the lurch, tired of trying to find quality Dragon Software in the shops? Relax! Now Salamander brings you the Software Discount Club which offers the best value in one of the widest ranges available.

Just clip the coupon below – get free membership to the Salamander Software Discount Club and see how much you can save. Membership gives you further discounts – a minimum of £2.00 and possibly much much more on any future order.

There's a Tandy 4 colour printer as 1st prize in the members only competition and, as a member you've the opportunity to contact the Dragon Agony Aunt with all your Dragon problems.

But remember – act now! – this is a special introductory offer – so send today and bring out the best in your Dragon with the Salamander Software Discount Club.

THE FRANKLINS TOMB TRILOGY

"Program of the month" Computer Choice

1 – Franklins Tomb
2 – Lost in Space
3 – Fishy Business

All come complete with 24 page illustrated manual.

£2 off each – were £9.95

NOW £7.95

STRATEGIC WIZARD WAR

A game of magical combat involving skill and luck. For 2-9 players.

"Wizard War stands out as the most original game" Popular Computing Weekly

£3 off – was £7.95

NOW £4.95

UTILITY D.R.S. DATA RETRIEVAL

The most sophisticated database available for the Dragon. Stores 22,000 characters 7 times more on disc. Allows any field searching. Ideal for storing addresses, recipes and business use.

£5 off – was £14.95

NOW £9.95

ADVENTURE WINGS OF WAR

The World War 2 adventure that's got them gripped from Swansea to Katmandu.

£3 off – was £7.95

NOW £4.95

EDUCATIONAL TURTLE GRAPHICS

Based on LOGO. A system which gives you an increased knowledge of geometry and a basic understanding of simple programming. An ideal educational tool for all ages.

£3 off – was £9.95

NOW £5.95

SAVE OVER £10

All 3 of the Franklins Tomb Trilogy featuring everybody's favourite detective – Dan Diamond.

Normally £29.85

NOW £19

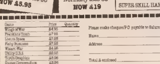
EXTRA SPECIALS

£4 off each of these six fabulous games

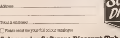
GAMES COMPENDIUM
NIGHTFLIGHT
STAR JAMMER
GOLF
VULCAN NOUGHTS & CROSSES
SUPER SKILL HANOMAN

Usually £7.95

£3.95 each



Game	Price	Quantity
Wings of War	£4.95	
Franklins Tomb	£7.95	
Lost in Space	£7.95	
Fishy Business	£7.95	
Wizard War	£4.95	
Utility D.R.S.	£9.95	
Turtle Graphics	£5.95	
Games Compendium	£3.95	
Nightflight	£3.95	
Star Jammer	£3.95	
Golf	£3.95	
Vulcan O & X	£2.95	
Super Skill Hangman	£3.95	
Franklins Tomb Trilogy	£19.00	



Please make cheques/P.O. payable to Salamander Software

Name __________

Address __________

Total £ enclosed __________

☐ Please send me your full colour catalogue

Salamander Software Discount Club
17 Norfolk Road, Brighton, East Sussex. BN1 3AA

Salamander SOFTWARE DISCOUNT CLUB

Letters

Life giver

To get some life into Richard Gain's program *Life* (August 23 issue) do the following

Poke 23326, 188
Poke 23327, 91
Poke 23480, 184
Poke 23481, 91

This will correct the code, which should then be re-saved.

A W Lee
Bromley
Kent

Win some, lose some

Whilst I tend to agree with the broader aspects of the editorial (August 16), I find the statement, "Where is the software that doesn't assume we are all gibbering trigger happy idiots " a little cynical.

It is clear that even gibbering idiots have a right to be catered for, although at the moment this does seem to be a little overdone

However, there is software for the less idiotic of us May I suggest that the editor has only to look to his own publication to find the intelligent and subtle software he refers to

Scott Murdoch (letters, August 30) mentioned the regular gripe with which we all agree — the price of software

Having just purchased an Amstrad CPC464, I was none to excited at the price of software, or its availability

Advertised in your recent editions was *The Trial of Arnold Blackwood*, an adventure game for the Amstrad. The price of £6 50 is just about what I consider fair for a decent game, so I ordered it It has kept my brain working and offered plenty of light relief with its weird humor. I haven't completed it yet, but the game inspires me to believe that I will.

I am sure that there are many more examples that meet with the cost, intelligence, subtlety factor, although it is often a case of win some, lose some.

I agree with Scott on the subject of documentaries, biographies, or even history books. If software is to be original, then it must surely avoid the known and well read. Perhaps it is creativity that is not in abundance.

Steve Drew
34 Regents Square
Belvedere
Kent

Interesfing conversation

I thought I should write and tell readers of *Popular Computing Weekly* and owners of the Sinclair QL Computer of an interesting conversation I had with Mr Tim Fountain, a Sinclair Research official at Cambridge.

The subject of upgrades to the QL package came up, as Mr Fountain reiterated that the QL User Guide would be updated and sent free to all QL owners. He also informed me that the Psion applications software would be updated and distributed in a similar fashion.

When I asked what exactly the point was of my joining QLUB — the QL Users' Bureau — he retorted, "It wouldn't be fair to offer the upgraded software to just QLUB members."

Alan Turnbull
Stockport
Cheshire

Complex words

I am sorry some readers had trouble with the Word Processor (Letters August 30) It is a very complex piece of software, but I think it is well worth the programming effort involved. I hope that the following will explain the difficulty with the input of new text

There is no different process, whether you wish to input a new document, insert text into an existing piece, or edit the existing text The method is the same

First you select how much of the existing text to display then you add, change and delete text on the screen. Now you send the screen back to replace the text displayed. When you are typing in new text, you display none of the lines of existing text, and send back the new text.

If you have used the default settings as published, you can simply depress the *Return* key twice when you have to enter the line to start the edit at, and the number of lines to show on the screen. This will select the line *after* the last line you have entered so far — initially, of course, that is set to the very first line of the text.

To start a new piece, it is best to *Finish* the program, then *Run* again This ensures that the line numbers and text are re-initialised.

To summarise — to input new text, edit a blank screen into the text you require

I use the program, as printed for all my correspondence and I find it very reliable and entirely satisfactory However, I should like to draw your attention to two misprints The reference to the *F5* key in the instructions should read *F3*, and the odd words, "position to turn red", after Line 1525 belong to the end of Line 1530

Simon Wallace
Basildon
Essex

A form of flattery?

Mr Godwin says programmers want to keep their routines secret.

Is that always so? If I thought of something good, I would want everyone to know so they could say what a clever chap I was.

On another tack does tape copying really reduce sales? When Psion announced *Scrabble* I haunted WH Smith with £15 cluched in my hot little hand, waiting for the first consignment to come in. Ditto *Chequered Flag* and The *Quill*.

Now, I do have copied programs that other people have given me (who can say they have not?) but they are all things that I wouldn't have bought anyway In fact I can imagine how copying can promote sales

Three impoverished arcade fans might contribute £5 each for original of Atari's over-priced *Pacman*, then make two copies This would give Atari one sale when they otherwise would have had none. I suppose Mr Godwin would say that was one sale instead of three

I don't know if this ever happens, but it is more likely than the proposition that every home copy represents one lost sale

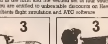
John Ward
58 Burnham Road
Leigh-on-Sea
Essex

Learn to Fly Competition: Week 3

Competition week 3 and here are this week's vouchers

Collect the four weeks' vouchers and fill out the coupons printed in the last week Send the form and the four 'plane' vouchers and you could win a go on a real flight simulator

Send in the form and the second set of four vouchers and you are entitled to unbeatable discounts on Hewson Consultants flight simulation and ATC software





Yahtzee

Try your luck in this version of the old dice game for the BBC B by Richard Dodd

Yahtzee is a five dice game written on the BBC micro computer model B. The object of the game is to score as many points as possible. There are many ways to do this, and these are shown on the score card. The simplest way of scoring points is to throw one or more of the same number. For example, if you throw three fours you will score 12 points.

There are also more complicated ways of scoring points. For example:

1 Full House. Three dice of one number and two of another, for example, three fives and two ones. This scores 25 points.

2 Low Straight. A sequence of four dice, for example, two, three, four and five. This scores 30 points.

3 High Straight. The same as a low straight but a sequence of five dice. This scores 40 points.

4 Yahtzee. Five dice all of the same number. Scores 50 — the highest number of points.

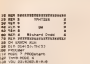
5 Chance. The points for chance are worked out by adding the total of all the dice together.

You can only enter one value into each section of the score card, so when you have thrown the dice you will have to decide into which is the best section to enter the score. You have three goes to try and get a scoring combination and any number of the dice can be thrown each time. As you continue you may find that you cannot get a scoring combination and you will be asked which of the sections you wish to cross out.

At the end of the game the total for the top half is added up. If the total is over 63 a bonus of 35 is added. If more than one person is playing each score card will be displayed separately and then the players names in order of their scores.

The program is well structured, with self explanatory procedure labels.





```
10 REM ************************
20 REM *       YAHTZEE        *
30 REM *                      *
40 REM *         BY           *
50 REM *                      *
60 REM *    Richard Dodd      *
70 REM ************************
80 ON ERROR RUN
90 DIM Die(5),Th(5)
100 PROCdef
110 MODE 7 PROCstart
120 Th=0 MODE 4
130 VDU 23;8202;0;0;0
140 FOR P%=1 TO Nu
150 CLS
160 PROCchoice
170 PROCdecision
180 PRINT TAB(0,29);STRING$(29," ") PRINT TAB(5,29);"Any Key To Continue  A$=GET$
190 NEXT P%
200 Th=Th+1 IF Th>12 PROCend ELSE CLS GOTO 140
210 MODE 7 PROCresults
220 RUN
230
240 DEF PROCstart
250 PRINT TAB(18,1);CHR$(161);"YAHTZEE"
260 PRINT TAB(18,2);CHR$(141);"YAHTZEE"
270 REPEAT INPUT TAB(10,10);"Number Of Players ";Nu UNTIL Nu>0 AND Nu<11
280 PRINT TAB(10,10);STRING$(29," ")
290 DIM Name$(Nu),Score(Nu,14)
300 FOR N%=1 TO Nu:PRINT TAB(0,10);STRING$(39," ");TAB(0,10)"Enter Name Of Player ";N%;:INPUT Name$(N%) Name$(N%)=LEFT$(Name$(N%),20) NEXT
310 ENDPROC
320
330
340 DEF PROCchoice
350 FOR G%=1 TO 3
360 IF G%=1 FOR C%=1 TO 5 Die(C%)=INT(RND(6)) NEXT PROCprint GOTO 390
370 L%=20-((LEN(Name$(P%))/2):PRINT TAB(L%,1) Name$(P%)
380 PRINT TAB(13,3);"Throw Number ";G%-1
390 PRINT TAB(1,20);"Arrow Keys And [RETURN] to select die'
400 PRINT TAB(8,22);"[R]  to roll dice again'
410 PRINT TAB(7,24);"[S] to see the Score Card"
420 *FX4,1
430 D=1 REPEAT D1=((D-1)*8)+3:PRINT TAB(D1,13);"^^" A%=GET
440 PRINT TAB(D1,13);"  "
450 IF A%=136 AND D>1 D=D-1
460 IF A%=137 AND D<5 D=D+1
470 D1=((D-1)*8)+3
480 IF A%=13 AND Th(D)=0 PRINT TAB(D1,12);"**" Th(D)=1 ELSE IF A%=13 Th(D)=0 PRINT TAB(D1,12);"  "
490 IF A%=84 CLS PROCcard PRINT TAB(5,29);"Any Key To Continue ":A$=GET$:CLS:PROCprint GOTO 370
500 UNTIL A%=82 OR A%=114
510 FOR C%=1 TO 5 IF Th(C%)=1 Die(C%)=INT(RND(6)) Th(C%)=0 NEXT ELSE NEXT
520 CLS:PROCprint
530 NEXT
540 PRINT TAB(13,3);"Throw Number ";G%-1
550 PRINT TAB(1,20);"Any Key To Continue To Score Card" A$=GET$
560 ENDPROC
570
580 DEF PROCprint
590 FOR X=1 TO 5
600 X1=((X-1)*8)+3
610 IF Die(X)=1 PRINT TAB(X1,10);CHR$(131);CHR$(130);TAB(X1,11)CHR$(133);CHR$(132)
620 IF Die(X)=2 PRINT TAB(X1,10);CHR$(135);CHR$(134);TAB(X1,11)CHR$(136);CHR$(137)
630 IF Die(X)=3 PRINT TAB(X1,10);CHR$(131);CHR$(138);TAB(X1,11)CHR$(139);CHR$(139)
640 IF Die(X)=4 PRINT TAB(X1,10);CHR$(140);CHR$(134);TAB(X1,11)CHR$(136);CHR$(141)
650 IF Die(X)=5 PRINT TAB(X1,10);CHR$(142);CHR$(130);TAB(X1,11)CHR$(139);CHR$(143)
660 IF Die(X)=6 PRINT TAB(X1,10);CHR$(144);CHR$(145);TAB(X1,11)CHR$(146);CHR$(147)
670 IF Th(X)=1 PRINT TAB(X1,12);"**
680 NEXT X
690 ENDPROC
700
710 DEF PROCcheck
720 Total=0
730 IF Ch>0 AND Ch<=6 PROCnumbers
740 IF Ch=7 PROC_3
750 IF Ch=8 PROC_4
760 IF Ch=9 PROC_full
770 IF Ch=10 PROC_Low
780 IF Ch=11 PROC_High
790 IF Ch=12 PROC_yahtzee
800 IF Ch=13 PROC_chance
810 ENDPROC
820
830 DEF PROCnumbers
840 FOR C%=1 TO 5 IF Die(C%)=Ch Total=Total+1
850 NEXT IF Total>0 Score(P%,Ch)=Ch*Total
860 ENDPROC
870
880 DEF PROC_3
890 Total=0 No=0 REPEAT No=No+1
900 FOR C%=1 TO 5 IF Die(C%)=No Total=Total+1
910 NEXT
920 IF Total<3 Total=0
930 UNTIL Total>=3 OR No=6
940 IF No=6 AND Total<3 GOTO 960
950 FOR C%=1 TO 5 Score(P%,Ch)=Score(P%,Ch)+Die(C%):NEXT
960 ENDPROC
970
980 DEF PROC_4
990 Total=0 No=0 REPEAT No=No+1
1000 FOR C%=1 TO 5 IF Die(C%)=No Total=Total+1
1010 NEXT
1020 IF Total<4 Total=0
1030 UNTIL Total>=4 OR No=6
1040 IF No=6 AND Total<4 GOTO 1060
1050 FOR C%=1 TO 5 Score(P%,Ch)=Score(P%,Ch)+Die(C%) NEXT
1060 ENDPROC
1070
1080 DEF PROC_full
1090 Total=0 No=0 REPEAT No=No+1
1100 FOR C%=1 TO 5 IF Die(C%)=No Total=Total+1
1110 NEXT
1120 IF Total<3 Total=0
1130 UNTIL Total=3 OR No=6
1140 IF No=6 AND Total<>3 GOTO 1220
1150 Total=0 No1=0 REPEAT No1=No1+1
1160 FOR C%=1 TO 5 IF Die(C%)=No1 AND No1<>No Total=Total+1
1170 NEXT
1180 IF Total<2 Total=0
1190 UNTIL Total=2 OR No1=6
1200 IF No1=6 AND Total<2 GOTO 1220
1210 Score(P%,Ch)=25
1220 ENDPROC
1230
1240 DEF PROC_Low
1250 FOR X=1 TO 5
1260 FOR Y=X TO 5
1270 IF Die(X)>=Die(Y) E=Die(X) Die(X)=Die(Y) Die(Y)=E
1280 NEXT NEXT
1290 Total=0 D%=1:C%=Die(1)+1 REPEAT D%=D%+1 IF C%<>Die(D%) Total=Total+1 C%=Die(D%) C%=C%+1 ELSE C%=C%+1
1300 UNTIL Total=2 OR D%=5
1310 IF Total<2 Score(P%,Ch)=30
1320 ENDPROC
1330
1340 DEF PROC_High
1350 FOR X=1 TO 5
1360 FOR Y=X TO 5
1370 IF Die(X)>=Die(Y) E=Die(X):Die(X)=Die(Y):Die(Y)=E
1380 NEXT NEXT
1390 Total=0 D%=1:C%=Die(1)+1 REPEAT D%=D%+1:IF C%<>Die(D%) Total=Total+1:C%=Die(D%):C%=C%+1 ELSE C%=C%+1
1400 UNTIL Total=1 OR D%=5
1410 IF Total<1 Score(P%,Ch)=40
1420 ENDPROC
1430
1440 DEF PROC_yahtzee
1450 Yaht=TRUE
1460 C%=1 S%=Die(1) REPEAT C%=C%+1 IF Die(C%)<>S% Yaht=FALSE
1470 UNTIL C%=5
1480 IF Yaht=TRUE Score(P%,Ch)=Score(P%,Ch)+50
1490 ENDPROC
1500
1510 DEF PROC_chance
```

Star Game

```
[illegible] IF Score[illegible] GOTO [illegible]
[illegible] FOR C%=1 [illegible]
[illegible] ENDPROC
[illegible]
1460 DEF PROCdecision
1470 CROSS=TRUE [illegible] REPEAT [illegible]
1480 IF [illegible] AND Score([illegible] PROCyat[illegible] IF
Score(P% Ch)=50 CROSS=FALSE
[illegible] AND Score([illegible] Ch))=50 PROCyahtzee IF
Score(P% Ch)=100 CROSS=FALSE
[illegible] Score[illegible] 6210 620
[illegible] Score P% Ch)=0 PROCcheck IF Score(P% Ch)>0
[illegible]=FALSE
[illegible] OR CROSS=0 38
[illegible] GOTO 1650
[illegible] GOTO 1740
[illegible]
[illegible] PROCcard
[illegible] Enter Your Choice (0 to see dice
A$=GET$ Ch=ASC(A$)
[illegible] TAB(15 3 [illegible] You Threw [illegible]
A$=GET$ CLS PROCcard GOTO 1670
1690 IF Ch>64 AND [illegible]<90 Ch=Ch-64 ELSE Ch=Ch-96
[illegible] OR [illegible] GOTO 1670
1710 IF Score[illegible] AND [illegible] PRINT TAB([illegible],29)
[illegible] GOTO 1670
[illegible] PROCcheck IF Score(P% Ch)=0 PRINT TAB(5 29)
[illegible] GOTO 1670
[illegible]
[illegible] ENDPROC
[illegible]
[illegible] DEF PROCcross
[illegible] PROCcard
[illegible] Which are You Going to Cross Out
[illegible] A$=GET$ Ch=ASC(A$)
[illegible] IF Ch>63 AND Ch<90 Ch=Ch-64 ELSE Ch=Ch-96
[illegible] IF [illegible] OR Ch>13 GOTO 1790
[illegible] IF Score(P% Ch)<>0 GOTO 1700 ELSE Score(P%,Ch)=-1
[illegible] score
1840 ENDPROC
1850
1860 DEF PROCadd
1870 Top=0 Bottom=0 Grand=0
1880 FOR R%=1 TO 6 IF R%<>-1 Top=Top+Score(P%,R%)
1890 NEXT
1900 PRINT TAB(30 12) Top IF Top>=63 Top=Top+35:PRINT
TAB(30 13) 35
1910 PRINT TAB(30 14) Top
1920 FOR R%=7 TO 13 IF R%<>-1 Bottom=Bottom+Score(P% R%)
1930 NEXT
1940 Grand=Top+Bottom PRINT TAB(30 24);Bottom;TAB(30 25);
Top;TAB(30 26);Grand
1950 ENDPROC
1960
1970 DEF PROCend
1980 FOR P%=1 TO Nu
1990 CLS PROCcard PROCadd
2000 Score(P% 14)=Grand
2010 PRINT TAB(5 29);"Any Key To Continue" A$=GET$
2020 NEXT
2030 ENDPROC
2040
2050 DEF PROCresults
2060 FOR X=1 TO Nu
2070 FOR Y=X TO Nu
2080 IF Score(X,14)<Score(Y 14) S%=Score(X,14) Score(X,
14)=Score(Y,14) Score(Y 14)=S% [illegible]
[illegible]
2090 NEXT
2100 NEXT
2110 PRINT TAB(1[illegible] 1) CHR$(141) "RESULTS"
2120 PRINT TAB(1[illegible] 2);CHR$(141) "RESULTS"
2130 PRINT PRINT
2140 PRINT TAB(5) "Position" TAB(20) "Player"
TAB([illegible]) "Score"
2150 PRINT
2160 FOR [illegible] TO [illegible] PRINT TAB(8) [illegible] TAB(19) Name$([illegible]
TAB([illegible]) Score([illegible],14) NEXT
2170 PRINT TAB(6 [illegible]) "Any Key To RUN Program Again" A$=GET$
2180 ENDPROC
2190
2200 DEF PROCcard
2210 PRINT "Score Card [illegible] Name [illegible] LEFT$(Name$(P% ),11)
2220 PRINT PRINT
2230 PRINT "Choice [illegible] Bonus [illegible]
2240 PRINT [illegible] CHR$(149)
2250 PRINT CHR$(149) A CHR$(149) Aces
1+1+1 = 3 ";CHR$(149)" ";CHR$(149)
2260 PRINT CHR$(149) B CHR$(149) Twos [illegible]
";CHR$(149)" [illegible] 149
2270 PRINT CHR$(149) [illegible] CHR$(149) [illegible]
CHR$(149)" CHR$(149)
2280 PRINT CHR$(149) [illegible] CHR$(149) Fours 4+1-4 [illegible]
CHR$(149)" CHR$(149)
2290 PRINT CHR$(149) [illegible] CHR$(149) Fives 5+5+[illegible]
CHR$(149) [illegible] CHR$(149)
[illegible] CHR$(149) [illegible]
CHR$(149)" CHR$(149)
[illegible] PRINT STRING$(39 CHR$(149))
2320 PRINT CHR$(149) TOTAL [illegible] 63 [illegible] CHR$(149)
CHR$(149)
2330 PRINT CHR$(149) [illegible] CHR$(149)
CHR$(149)
2340 [illegible] CHR$(149)
[illegible] CHR$(149)
2350 [illegible] CHR$(149)
[illegible]
[illegible] CHR$(149)
2370 PRINT CHR$(149) H CHR$(149) [illegible]
CHR$(149) CHR$(149)
2380 PRINT CHR$(149) I CHR$(149) [illegible]
CHR$(149) CHR$(149)
2390 PRINT CHR$(149) [illegible] CHR$(149) [illegible]
CHR$(149) CHR$(149)
2400 PRINT CHR$(149) [illegible] CHR$(149) [illegible]
CHR$(149) CHR$(149)
2410 PRINT CHR$(149) [illegible] CHR$(149) [illegible]
CHR$(149) CHR$(149)
2420 PRINT CHR$(149) [illegible] CHR$(149) [illegible]
CHR$(149) CHR$(149)
2430 PRINT STRING$(39 CHR$(149))
2442 PRINT CHR$(141) [illegible] of bottom
CHR$(149) CHR$(149)
2450 PRINT CHR$(149) TOTAL [illegible] CHR$(149)
CHR$(149)
2460 PRINT CHR$(149) GRAND TOTAL [illegible] CHR$(149)
CHR$(149)
2470 PRINT STRING$(39 CHR$(149))
2480 PROCadd
2490 ENDPROC
2500
2510 DEF PROCscore
2520 FOR S%=1 TO 14
2530 IF S% [illegible] AND Score([illegible] PRINT TAB(30 [illegible]) Score(P% [illegible]) ELSE IF [illegible] AND
Score(P% [illegible]) = 1 PRINT TAB(30 [illegible])
2540 IF S% >7 AND Score([illegible]
PRINT TAB([illegible]) Score(P% S%) [illegible] IF [illegible]
[illegible] PRINT TAB([illegible])
2550 NEXT
2560 ENDPROC
2570
2580 DEF PROCdef
2590 VDU 23 130 255 [illegible]
2600 VDU 23 131 255 [illegible]
2610 VDU 23 132 129 [illegible]
2620 VDU 23 133 [illegible]
2630 VDU 23 134 255 [illegible]
2640 VDU 23 135 255 128 [illegible]
2650 VDU 23 136 128 128 [illegible]
2660 VDU 23 137 [illegible]
2670 VDU 23 138 255 [illegible]
2680 VDU 23 139 [illegible] 128 [illegible]
2690 VDU 23 140 255 [illegible]
2700 VDU 23 141 [illegible]
2710 VDU 23 142,255 [illegible]
2720 VDU 23 143 [illegible]
2730 VDU 23 144 255 [illegible]
2740 VDU 23,145 255 [illegible]
2750 VDU 23 146 [illegible]
2760 VDU 23 147 255 [illegible]
2770 VDU 23 148 0 0 0 255 0 0 0 0
2780 VDU 23 149 0 0 [illegible]
2790 ENDPROC
```

Mirrorsoft is here...

The 7th Personal Computer World Show 19th to 23rd September Olympia 2, London.

there...

Holborn Circus, London EC1

and everywhere.

and all good retail software stockists





Avoiding the pitfalls

Christian Erskine talks to Geoffrey Heath at Activision

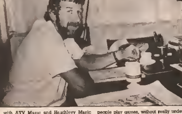
In an industry not noted for slick professionalism and sophisticated marketing—instead one tends to think of individuals working all night running off cassettes on the kitchen table—Activision has earned some renown in both areas.

Formed in 1979 by Jim Leavey, who had a long background in video games, it made its name with games such as, Freeway, Grand Prix, Pitfall and River Raid for the Atari 2600. In June 1983, the company went public in the US.

Its UK division was established at the beginning of this year as Activision prepared to move from producing cartridge software for Atari to establish material for a wider base of machines.

The American influence has been much in evidence in its advertising, with promotional videos and expensive—well, it looks expensive—packaging.

I therefore expected UK managing director Geoffrey Heath to at least have a transatlantic accent, fat cigar and possibly a Stetson on the hatstand. None of these things materialised.



Geoffrey was plucked from 20 years in the British music publishing business with ATV Music and Heathlevy Music among others to set up and develop Activision's base in Britain and Europe. Today there are eight people housed in the UK offices with a further two in France. Next on Activision's target list is Germany, and then comes Japan.

The plans to diversify from the Atari VCS machines evolved over a year ago in the US. "They were making plans then to begin converting the games to Commodore— and Spectrum for the British market—and also the MSX machines. The Atari boom had ended, and it seemed the only answer," said Geoffrey.

"The time between the idea and the actual launch this autumn has been taken up with setting up the UK base and writing the conversions for the other machines, particularly the Spectrum.

"The policy has been to take the best of our video games and enhance them, while developing new games as well. I suppose if video games come back into vogue, we could always convert them all back again."

This autumn Activision converted Beamrider, Decathlon, Pitfall II, River Raid, Space Shuttle and Zenji for MSX, seven titles for Spectrum and six for Commodore, from Atari video games.

Activision's next release will be something rather different, however. *Pencil* will be available in about six weeks time for both the Commodore 64 and the Spectrum. It is a menu-driven graphics-drawing aid — on the Commodore it incorporates a sound generation aid. The user selects from the menu to program the 'pencil' itself.

"It is a bit different," said Geoffrey. "The idea behind it is that a lot of people play games, without really understanding what the computer is doing. This helps build up a picture, as it were, of what programming involves. If you had to describe Activision's products in one sentence, they're 'software for leisure purposes', and I think our *Pencil* fits that description."

Pencil, incidentally, will cost around £10.00 for the Commodore version and in the region of £8.00 on Spectrum.

The 'leisure software' is largely aimed at a young market—"My view is that the majority of home computer users are between four and 18 years old. Parents don't get involved until later. In a way, computers are developing along similar lines to the pocket calculator market.

"Not so long ago, calculators were considered to be something a bit gimmicky—now my son is told he has to have one for school. In a few years, the home computer will occupy the same status in a household as the telephone, the TV or the washing machine.

"This is where I think the MSX machines will be important. The technology may be basic, but they'll be reliable and the next generation will I'm sure be much improved. Machines like MSX will find their way into households in which people aren't particularly computer-minded and I can also see companies like JVC developing their music centres to incorporate a micro."

Now that Activision has established itself in the UK, it is taking the next step to conformity and applying to join GOSH.

"I think it's a good idea if only because we're in what is still a small industry and we should all get on well with each other. Within GOSH, I'd like to see them getting much more aggressive over piracy—after all, the music industry has managed to curb piracy to a large extent and I think the software industry can do it too."

In case anyone reading that is now rubbing their hands with glee at the thought of an Activision Microdeal confrontation (after Activision halted sales of the Microdeal title *Cuthbert in the Jungle*) within the Guild of Software Houses, they will be disappointed. "The Microdeal episode is over and done with. We did the right thing, they did the right thing, and it's all water under the bridge now.

"But it does seem to have engendered a view that we are a giant 'nasty American' company, which is rubbish. Four years ago, it was a one-room set-up designing cartridge games for the Atari 2600."

Comparisons are frequently drawn between software and the pop music industry—how does Geoffrey, having worked in both, view them. "They're certainly similar in that both are 'hits' businesses—you're dealing with a product that's in vogue.

"In terms of progress, though, the software industry is tremendously exciting — you have to keep on one foot all the time, and it'll continue at a fast pace, as long as people have more and more leisure time, and spend a lot of that time in the home."



THE ULTIMATE IN JOYSTICK INTERFACES

programmed never needs programming again!

THE FOX PROGRAMMABLE INTERFACE — AN INTERFACE WITH

- Complete compatibility with all programs
- In built memory to store up to 16 different games keysets at one time
- A reset switch so no power off during game changes
- Full casing
- Through port for further expansion
- Full compatibility with the microdrive
- Built in psaudo ROM facility with room for personal tool kit
- Quickshot II joystick rapid fire compatible

The interface reviewed in Sinclair User as "very good value" and "very clever and provides the easiest interface on the market to use"

ALL THIS FOR **ONLY £28.95** INCL
or COMPLETE WITH A QUICKSHOT I JOYSTICK FOR
ONLY £34.95 INCL
or with QUICKSHOT II JOYSTICK
ONLY £36.95

PLUG IN SWITCH ON AND SIMPLY PLAY THE GAME WITH FOX

ZX SPECTRUM 32K UPGRADE

ISSUE 2 AND ISSUE 3

TAKE YOUR 16K SPECTRUM TO 48K IN SIMPLE STEPS. THE KIT REVIEWED BY SINCLAIR USER AS "THE BEST BUY" FULL INSTRUCTIONS SUPPLIED AND FULL GUARANTEE GIVEN

ONLY £23.00 INCL

AMAZING!!! FOR THE VIC-20

16K SWITCHABLE RAM PACK

- *Gives you the option of 16K, 8K or 3K in one cartridge*
- *Simply plugs into rear port.*
- *Fully compatible with all existing motherboards*
- *Fully guaranteed (1 year)*
- 14 day moneyback guarantee if not delighted
- *No re-addressing of existing Basic programs needed*

£34.95

All products are stocked and are despatched within 14 days

PLEASE SEND ME

- ☐ INTERFACE
- ☐ INTERFACE + JOYSTICK
- ☐ SPECTRUM UPGRADE
- ☐ VIC-20 16K RAM PACK

Name ....

Address ....

....

Barclaycard No Visa

☐☐☐☐☐☐☐☐☐☐☐☐☐

FOX ELECTRONICS

FOX HOUSE 35 MARTHAM ROAD, HEMSBY
GREAT YARMOUTH, NORFOLK NR29 4NQ
Tel. 0493 732420 (24 HR Ansaphone/sales)

Head down

Hardware *LoProfile keyboard* **Micro** Spectrum **Price** £49 95 **Supplier** Advanced Memory Systems, Green Lane, Appleton, Warrington

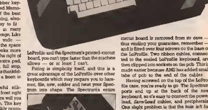
There are now at least half-a-dozen manufacturers producing alternatives to the Spectrum's tacky rubber keyboard. The LoProfile by Advanced Memory Systems seems to be one of the best available, because it's good-looking, electromechanically simple, and easy to fit

The latest version improves in many small ways the original ProFile design. Like the first model, it's low and wide — needlessly wide, since much of the space inside ends up empty — and looks more like a QL than anything else To the right of the main keyboard is a 12-key extra pad, which duplicates the numerical, full stop, caps shift and cursor keys There's thankfully a proper space bar which is a boon in word-processing applications.

The new design has tasteful silk-screened red flashes across the front right and along the top, though nowhere will you find the words Sinclair Spectrum. The key legends are accurately and durably reproduced, with the colour information printed on the case above the top row of keys

The case itself is in two pieces The top half is high-impact plastic Unfortunately, for some reason the same isn't true of the base — it's a much more flimsy plastic, which appears rather brittle for this application.

The keys themselves are pitched oddly, as you'll see if you examine them from the side, but this doesn't seem to affect their performance There's a satisfying "click" and since there's no "buffer" between the LoProfile and the Spectrum's printed-circuit board, you can't type faster than the machine allows — or at least I can't.



Fitting is simplicity itself, and this is a great advantage of the LoProfile over other keyboards which may require you to hammer, file, saw, solder and twist your Spectrum into shape The Spectrum's entire circuit board is removed from its case — thus voiding your guarantee, remember — and is fitted over four screws on the base of the LoProfile. Two ribbon cables, connected to the sealed LoProfile keyboard, are then clipped into sockets on the pcb This is made easier because AMS has added small tabs of pcb to the end of the cables

Having screwed on the top of the LoProfile case, you're ready to go The Spectrum ports end up at the back of the new keyboard, so it's easy to connect the power lead, *Save/Load* cables, and peripherals. One slight problem is that the hole left for the user port is very large — just to ensure that no foreign objects get into the keyboard, it might be an idea to invest in a Currah Microslot motherboard, which neatly fills the gap It's good practice to use a Microslot anyway, since it's cheaper to replace a worn-out Microslot than it is to replace a worn-out Spectrum.

All in all it's a joy to use a real keyboard on the Spectrum, and the simplicity and appearance of the LoProfile make it a good choice

Chris Jenkins

Imp print

Hardware *Micrographic Interface MW350* **Micro** Commodore 64 **Price** £90 **Supplier** Impex Designs, Metro House, Second Way, Wembley, Middlesex.

One of the latest add-ons for the Commodore range of home computers (including the new C16 and Plus/4 models) to cross the Atlantic is a very ambitious intelligent Centronics printer interface The Micrografix interface MW-350 is ambitious because not only does it provide a Centronics output to any standard printer, but it also uses the Commodore Serial I/O port as if it were a Commodore printer, produces a full set of Commodore graphics characters on most common dot-matrix printers, produces legible replacements for the graphics characters if required, and allows for an in-built buffer of up to 4096 bytes.

The interface uses a CMOS 6502 microprocessor to decode any output from the Commodore computer and to drive the printer as required. Different printers are catered for by alternative machine-code routines held in Rom. Printers on which graphics can be produced include the Epson range, Mannesman Tally, Microline, Seikosha, Star, Riteman, and NEC Many other dot-matrix printers use the same command codes as one of these and hence can be used satisfactorily, assuming the printer has a graphic mode

Using the interface is exactly the same as using a Commodore printer, but with some additional facilities. Commercial software, such as for word processing, should thus still work happily Additional facilities include setting of page length, margins, conversion of all output to print ASCII codes only, re-setting the Commodore device number and secondary address recognised by the interface, and changing the auto-linefeed setting

The importer, Impex Designs (UK) provide a full customer service They keep a list of printers which are compatible with the full graphics facilities and will try to sort out any problems which may arise The price above includes a 2K buffer

John Cochrane



CURRAH µSPEECH
Speech Synthesiser for ZX Spectrum
The CURRAH µSPEECH is ready to talk im
power up has an infinite vocabulary and ou
and ZX Spectrum sound through your TV speaker. There is no software to load with µSPEECH — sophisticated Gate Array technology means you can just plug in and start constructing words and sentences like this
LET S$ = "sp(ee)k (nn)(oo) (ee)vil" will say "speak no evil"! Further commands control the "voicing" of keys as they are pressed and an intonation facility allows you to add expression to the speech
µSPEECH is fully compatible with ZX Interface 1 and may be used with the CURRAH µSLOT Expandable Motherboard allowing easy expansion of your ZX system. µSPEECH and µSLOT will also be compatible with the CURRAH µSOURCE unit when it arrives later this year, allowing you to write Assembler and FORTH statements directly into your BASIC programs!
Top selling games like ULTIMATE'S Lunar Jetman feature µSPEECH voice output — watch out for other titles from Bug-Byte CDS Ocean Quicksilva and PSS
WOOLWORTHS GREENS JOHN MENZIES
SPECTRUM STORES and good dealers nationwide — or use the form to order the CURRAH µSPEECH — winner of the CTA 'Product of the Year' award 1984.
CURRAH
Postcode
See us at the PCW Show Stand 329



MEMOTECH MTX500
£35.0
FREE SOFTWARE
The Ultimate.
Only £199.
USER RAM
THE KEYBOARD
MEMOTECH
MEMOTECH
MTX
SERIES
Snowball
Adventure Quest
Lords of Time
DRAUGHTS


BEYOND
CHALLENGING SOFTWARE
FOR ACTION, ANIMATION, ADVENTURE
AZTEC
VOTED THE BEST ARCADE ADVENTURE GAME IN THE U.S.
Run, Crawl, Fight and Climb . . .
HERO!
You'll spend the next month marvelling at the animated horrors which await him in a lost temple deep beneath the South American jungle. Eight skill levels and a temple complex with more possible layouts than you can ever exhaust.
Mr.Robot's...
OBSTACLE COURSE CAN NEVER BE DEFEATED! . . . because you can build more of it yourself!
This Robot Factory turns out the toughest androids around It's fiendish 22 screens of challenge feature escalators, treadmills, energiser tokens bombs matter transporters, trampolines, deadly alienfires and much more
We've designed 22 tough combinations for the robots but you can design your own through a unique easy-to-use constructor set, building up a screen to play save and challenge your friends with
PLEASE SEND ME
ANKH £8.95 (cassette) £11.95 (Disk) Commodore 64
MY CHESS II £8.95 (cassette) £11.95 (Disk) "
AZTEC £8.95 (cassette) £11.95 (Disk) "
Mr. Robot £8.95 (cassette) £11.95 (Disk) "
QTY
TOTAL
Beyond order line 0858 34567
Beyond hotline 01-837 2899
Please rush me details of the "Beyond" club!
I enclose a Postal Order/Cheque to Beyond, or charge my Credit Card
CARD No
NAME
ADDRESS
Post Code
Signature
PCW
BEYOND, Competition House, Farndon Market Harborough Leicestershire LE19 9NR

Obliterated

Program *Space Station Alpha* **Micro** BBC B **Price** £7 95 **Supplier** Icon Software, 65 High Street, Gosforth, Tyne and Wear

As the Cylon fleet commences its final assault on planet Earth, one last space station — Space Station Alpha — remains to resist their attempts... and quite naturally you are its commander

Described on the cover as a 'Graphical Space Battle', the visual display on *Space Station Alpha* is a colourful yet simple mixture of fixed graphics — a partial view of the space station, the Earth and the Moon (or is it the Sun?) in the background, and the dynamic elements — the missile sights, and the Cylon ships swooping in from the top right of the screen to deliver their lithium torpedoes before weaving away across the display

The duration of the game is determined by the strength of the Earth's defence shields, the force of which is depleted from its original value of 10000 with each lithium torpedo strike 10000 is a generous point to start from and provides for a good length game. Without laying a hand on the controls, I sat and watched the first three waves of the Cylon fleet batter away for about five minutes before the Earth's defences finally cracked When its shields are exhausted, the Earth is doomed and is obliterated from the screen in an explosion which sends debris flying off into space

Two criticisms of the game Firstly, the action is limited to a single, repetitive attack sequence There are no screen changes and only slight variations in the speed and altitude of the Cylon ships as successive waves are destroyed. Inevitably, therefore, whilst the addictive challenge of 'up-ing' the high score remains, I found that I reached my 'game-esturation' level that much sooner

Secondly, I was unable to discover any instructions on my copy of the game, either on the presentation box cover, as advised on the cassette label, or as an 'intro' in the program. Fortunately the controls were all fairly standard, the game loading with the CH"" (previously reset PAGE=&E00 if a DFS is fitted), and with Z-(left), X-(right), *-(up), ?(down) and Space-(fire) as the 'in-game' controls.

On the whole, pretty average arcade action.

Simon Wilson

Alien blabs

Program *SOS* **Micro** Spectrum **Price** £5 95 **Supplier** Vegons, 1 Feldgate Mews, Studland St, London W6

Another one for the arcade freaks here, with the usual menu of various alien blobs a rather underpowered space shuttle and a pathetic bunch of humanoids to rescue from a hostile planet

You arrive in a mother ship, which says the instructions is in geostationary orbit. I wish people would think before they write, as the mother ship moves about until you leave it, whereupon it conveniently stays still. The shuttle motors are unable to move you up the screen before you pick up a survivor, but the extra weight seems to invigorate them, as on take off you are unable to move down the screen. Oh well, it's only a game.

There are joystick options for Kempston and Sinclair, and the controls worked well. I can't say the graphics were very special, nor was the sound anything to write home about, but the game is very playable, and will prove addictive for some

Simon Finch has come up with a competent game, 100% machine code and using many good techniques (though it won't work with Interface I attached) It's up with the field, although probably not special enough to be one of the leaders.

Simon Springett

Profitable

Program *French Revision Level 1* **Micro** Spectrum **Price** £4.99 **Supplier** Southern Educational Software, 4 Priory Rd, Maidstone Kent ME15 6NW

Hands up all parents who thought that buying a computer would help your child with his or her school work Hands down if it has All those with aching arms and children aiming to take CSE or "O" level modern languages can now redeem the situation by getting hold of a series of no gimmicks, but user-friendly learning tapes from Southern Educational Software.

I sampled the *French Revision level 1* tape and found it to be well worth the asking price of £4 99 The programs — two different lessons — teach verbs, nouns and adjectives and follow up with a series of tests of knowledge learned Both were at a very basic level, and covered the ground thoroughly if a little tediously at times.

The tests were, I felt, rather too easy: they were all of the "multiple guess" variety, and thus could leave you feeling that you knew more than you actually did — but this was only Level 1

The programs are written in Basic and are well protected against the amateur hacker I suspect the level of protection is responsible for a number of loading problems I had. one part of the program would not work with Interface 1 attached, probably due to some machine code in Rem statements in the loader program.

The only graphics used are for accented letters and sound is not used especially well, but the display is clear and does make use of colour and large printing

All in all a more profitable use for your Spectrum than *Space Invaders*, and with the new term just beginning these packages should sell well.

Simon Springett

Take-off!

Program *Air Traffic Control* **Micro** Spectrum **Price** £5.95 **Supplier** Mikro-Gen, 44 The Broadway, Bracknell, Berks.

The first thing that I must say is that I had never even seen, let alone played, an air traffic control simulation before But then they say that comparisons are odious.

As an Area ATC, one has to direct the inbound, outbound, and local flights over an area of central/southern England. The purpose of the game is not to land planes, but to administer their flight paths over the area of your control. Needless to say, there are various problems, such as errant RAF aircraft over which you have an control, unstable cabin pressure on some planes collision courses and so on.

By far the most attractive part of this package is the remarkable attention to detail that is shown in both the program and the manual. Mikro-Gen have not fallen short of offering a challenge; at level seven out of nine, the program simulates a busy summer's day at Heathrow, with up to 60 flights an hour to be dealt with.

There were many things this surprised me about playing ATC, not least being the fact that I actually enjoyed the experience. I am not sure if I would play it frequently, but it certainly provides a welcome diversion from main-stream micro entertainment.

Gordon Sneddon

On the slopes

Program *Bear George* **Micro** Spectrum **Price** £5.95 **Supplier** Cheetahsoft, 24 Ray St., London EC1

My first viewing of this game was by way of an introduction to the RAT, the remote joystick. The sense of excitement and interest generated by said device was such this Tic Tac Toe would have been a hit. And yet here wa as in the clear light of day, and the game must stand on its own merits These, however, are few

Bear George consists of three 'playing screens' which, upon successful completion, then repeat themselves over and over again. First you must catch and eat falling apples while dodging most aggressive acorns. Then to the ski slopes, to take George to his cave and avoid the malicious skier

Now only some fairly uninspiring, though deadly, spiders block George's way to six months sleep If he has eaten enough apples, he will survive hibernation without starving Thrilling, huh?

Believe me, it isn't. The most commendable feature of this program is the graphics, which are certainly of above average quality, and it is a shame to see them employed in such an undemanding context.

And of the RAT? I'll stay with joysticks.

Gordon Sneddon

L plates

Program *Highway Code* **Micro** Spectrum **Price** £6.95 **Supplier** Datek Computing, 11 Warwick Court, Princes Drive, Harrow, Mddx.

You can't actually learn to drive on a Spectrum as yet, but *Highway Code* will help you to pass the test when you get around to taking it This is a straightforward educational program teaching some of the main aspects of the Code in a useful way, and enabling you to test yourself against an impartial judge

It could lead to an end of nagging the rest of the family to test you in the days leading up to the cycling proficiency or driving test. It uses to the full the micro's ability to be a patient and infallible teacher.

The program is very user friendly, and covers a variety of topics. It seems to be written in machine-coded Basic: thus the sections load as bytes, but run fairly slowly The "fill" routine in the section on signs giving positive orders was one yawning example. There is good break protection, making the program ideal for the inexperienced user

The tests are timed so that you have an incentive to answer quickly, and you are given your score at the end of the test. Importantly, there is an option to "Correct Mistakes", as well as to use the solutions

Written mainly for the car driver, the program will still be of use to other road users, and would be an ideal gift for anyone starting to ride or drive

Simon Springett

No humour

Program *Valnor's Lair* **Micro** Oric/Atmos **Price** £8.95 **Supplier** Quicksilva, P.O. Box 6, Wimborne, Dorset BU21 7DY

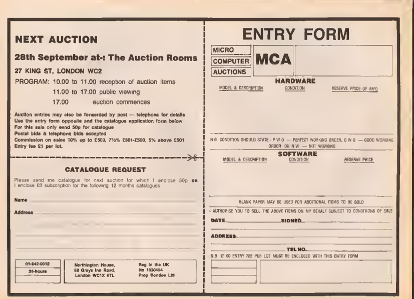
The goal of this text only adventure is to seek out Velnor the Black Wizard hiding in the Goblin Labyrinth of Mount Elk. A skillful adventurer should be able to spot the false trails, pick up clues and objects and avoid being wiped out too quickly by the collection of enemies lurking in the maze. The labyrinth is complex and something is encounterd at almost every move, there being enough tricks and puzzles to keep even a well-seasoned adventurer occupied.

The text itself is fairly descriptive but perhaps lacking originality in the settings (caves and passages) and monsters (the ubiquitous Ogre) The text also lacks any sense of humour to offset the seriousness of being killed.

As an adventure game *Velnor's Lair* is very good, but don't let Velnor the Illusionist fool you into thinking this game has any resemblance to *Dungeons & Dragons* as the cassette blurb states.

Velnor's Lair can be played as one of three charcters, Warrior, Wizard or Priest Warriors have strength points only, whilst Wizards and Priests have strength and spell points. Spells are obviously useful, although they can backfire However, I found little difference when playing these characters and the use of 'hit' points superfluous.

Vic Fielder


NEXT AUCTION
28th September at-: The Auction Rooms
27 KING ST, LONDON WC2
PROGRAM: 10.00 to 11.00 reception of auction items
11.00 to 17.00 public viewing
17.00 auction commences
Auction entries may also be forwarded by post — telephone for details
Use the entry form opposite and the catalogue application form below
For this sale only send 50p for catalogue
Postal bids & telephone bids accepted
Commission on sales 10% up to £300, 7½% £301-£500, 5% above £501
Entry fee £1 per lot.
CATALOGUE REQUEST
Please send me catalogue for next auction for which I enclose 50p OR I enclose £3 subscription for the following 12 months catalogues
Name
Address
01-242-0012
24-hours
Northington House, 59 Grays Inn Road, London WC1X 8TL
Reg in the UK No 1630494 Prop Bondoe Ltd
ENTRY FORM
MICRO
COMPUTER
AUCTIONS
MCA
HARDWARE
MODEL & DESCRIPTION
CONDITION
RESERVE PRICE (IF ANY)
N B CONDITION SHOULD STATE - P W O — PERFECT WORKING ORDER, G W O — GOOD WORKING ORDER OR N W — NOT WORKING
SOFTWARE
MODEL & DESCRIPTION
CONDITION
RESERVE PRICE
BLANK PAPER MAY BE USED FOR ADDITIONAL ITEMS TO BE SOLD
I AUTHORISE YOU TO SELL THE ABOVE ITEMS ON MY BEHALF SUBJECT TO CONDITIONS OF SALE
DATE
SIGNED
ADDRESS
TEL NO.
N B £1 00 ENTRY FEE PER LOT MUST BE ENCLOSED WITH THIS ENTRY FORM

Working in Plus/4s

***John Cochrane** take a first look at the four Rom software packages included with Commodore's new Plus/4 micro*

Commodore are producing two new machines for the home computer market this year. The C16 looking very much like a Vic20/C64 but with improved Basic, and the Plus/4 with a full 64K of user memory (less around 8K for the system variables and the display memory).

The C16 and the Plus/4 share the same Commodore Basic 3.5, but there the resemblance ends. The Plus/4—in my opinion much the more stylish of the two machines—also contains a suite of built-in software known as *3-PLUS-1*.

This gives facilities for work processing, record filing, spreadsheet operations, and simple graphics.

However, do not begin to think that Commodore are throwing the gauntlet down in Sinclair's direction, *3-PLUS-1* is simply not in the same class as the QL software despite offering full integration.

Integration is a well-used word these days for machines such as the IBM PC, and integrated software comes in many colours. Commodore have undoubtably scored several points with *3-PLUS-1* which is integrated into the machine. Press a button or two and the ROM-based software is up and running, no loading from disc or cursing of microdrives here and since all the packages are available in memory at the same time and it is very easy to transfer data from one to the other. The disadvantage—in the case of the Plus/4 is that the four packages are contained in two Roms totalling 32K of memory. Even though they call routines from the system Rom and kernal, the size of the programs has still had to be kept quite small and, consequently, quite simple.

Data Manager is the data filing program which works to the common theme of setting up a number of very similar records, names and addresses for instance, on disc then allowing various operations to be performed. Searches can be made for particular data items, perhaps a particular name, the records can be sorted alphabetically, and the records can be used to supply names or other information for use with the word processor. This last feature is perhaps the one offering most practical potential as it allows things like personalised circulars, mailshots, and data-file reports to be easily and rapidly produced.

The word processor is of limited capability, offering only 99 lines of 77 characters. Sufficient for letter writing but not much else. Also, as the screen display is limited to only 37 characters, a rather clumsy system of panning across the document being typed has been adopted, making it difficult to read and edit a document. Still, the basics are there. (The illustration here has used carriage returns half-way through each line in order to be able to show the whole document on-screen at the same time.)

Spreadsheets can also be set up, on a grid of cells in 50 rows and 17 columns. Memory limitations will usually mean that only about half these cells can actually be used however Commodore has decided to go its own way on the spreadsheet in terms of the manner of addressing individual cells and with some of the functions provided for setting up the spreadsheet. If you have used other spreadsheets then you will probably find this one slow and limited. If you are a beginner then I would advise you to avoid this one as you will soon outgrow it and may experience unnecessary confusion transferring to another. The value of the program is that it is almost instantly available and can be used to set up data for transferring to the word processor.

Finally, the graphics package. Very limited is the most apt description. This is the *PLUS-1* program in the 3-plus-1 package and is really just a tag-on to the spreadsheet which allows a visual representation of data to be rapidly set up and transferred to the word processor. Commodore claims to have avoided using the high-resolution screen in order to provide a graph which can be reproduced by a standard Commodore printer, and I must admit that the printer commands are built into the software. Even so, I would have thought it would be possible to provide a little more in the way of alternative display formats, this thing will not even show negative values and only one set of data can be viewed at any one time.

All the programs do really require a disc drive to store data—using a cassette drive is rather clumsy—and so the real cost of the full system, less printer, is getting high.

On the whole I think that Commodore could have done a bit better than this.

The limited scope of the software will unfortunately mean that the Plus/4 is unlikely to find favour—as Commodore has indicated it should—with small businesses. At the Plus/4's offical launch last week Howard Stanworth, general manager of Commodore UK, did admit: "A typical buyer will not be running a business using the Plus/4—if so it will be a very small business."

The Plus/4 is a good—if a little overpriced at £299—machine made better by its integrated software. But don't buy the machine just for its software.


£25 For Your ZX81
In Part-Exchange For A Memotech MTX 500
For a limited period only Barbary Computers are offering a fantastic deal on Memotech machines. We will allow a £25.00 trade in discount against any computer, from a ZX81 to an IBM PC, plus a further discount of 50% of the retail price of any Memotech Memopaks you trade in when you purchase a Memotech MTX500. Trade in your computer and the price of the Memotech MTX500 drops to only £174.00, even less if you trade in your Memopaks!
Free Software worth over £35
Memotech MTX500 Major Features
Trade in Price ONLY £174.00
barbury computers
89 VICTORIA RD SWINDON WILTS SN1 3BD
TEL (0793) 611487
BINGO
UP TO 4 PLAYERS AT ONCE
A FIVE YEAR OLD OR GRANNY CAN PLAY
£100.00 TO BE WON EACH MONTH
FOR FURTHER DETAILS RING TREVOR ON 091 414 4611
66
ACTUALLY SHOUTS THE NUMBER OUT
FUN FOR ALL THE FAMILY
COMPUTER SOFTWARE
ALL TITLES AVAILABLE FROM TYNESOFT
SUPERFILE 64
CMBA CASS £17.95. DISK £19.95
FIREMAN FRED
SPEC. £5.95
AUF WIEDERSEHEN
SPEC. £5.95 CMBA £6.95
BBC/ELECTRON £6.95
ANSWER BACK
QUIZZES
GENERAL KNOWLEDGE
THE ULTIMATE CHALLENGE
ANSWER BACK Junior Quiz
ANSWER BACK Senior Quiz
Address

Pulling a few strings

L Herniman demonstrates the pulley system known as Attwood's machine in micro form

This program demonstrates a simple pulley system known as 'Attwood's Machine' in which two masses are connected by a light inelastic string passing over a smooth frictionless pulley

The acceleration of the two masses and tension in the string are calculated after values for the two masses have been entered. A diagram shows the directions of the forces, and each step of the calculation is clearly displayed. The two answers given for each are the acceleration only, and acceleration due to gravity Gravity is taken as 9.8 m/sec/sec, but may be changed in line 10.

The program uses the equation from Newton's Second Law, Force = mass × acceleration (F = ma) When applying this to our pulley system, the smaller mass will always move upwards, as the tension in the string is greater than its weight, ie, tension − weight = upward force The larger mass moves down, obviously, with a force of weight − tension (= m × a) Note that if the masses are the same, the system remains stationary in equilibrium.

To make the program self contained, the notation used is printed at the start, but this can be left out by deleting line 5 and lines 400 to 460

Program notes

30-60	Inputs masses and sorts them so that m1 is the smaller
70-100	Prints out statements.
110-130	Works through equation to find acceleration.
160-170	Substitutes value of acceleration in the first equation and find tension.
220-250	Generates four graphics.
260-380	Prints out screen.
400-460	Prints out notation.

```
         © L Herniman 30/1/84

              "PULLEY"

         -Attwood's Machine-
        ('A' Level mechanics)

  5 CLS : GO SUB 400
REM    For instructions only
  10 GO SUB 220  LET t$=CHR$ 146
+CHR$ 32  LET gr=9.8  GO TO 30
  20 GO SUB 260
  30 INPUT "Enter value of each
mass>> ",m1,m
  40 IF m1<m THEN LET m2=m  GO T
O 70
  60 IF m1>m THEN LET m2=m1. LET
 m1=m  GO TO 70
  68 PRINT AT 21,1,"System remai
ns in equilibrium". PAUSE 200. G
O TO 20
  70 PRINT AT 16,20;m1,"gN",AT 2
0,29-(m2>9),m2,"gN"
  80 PRINT AT 2,0,"From Newton's
 2nd"'"      Law, F=ma"
  90 PRINT '"For ",m1,"kg mass,T
>wght"'t$,"T-mg=ma ",t$,"T=ma+mg
"
 100 PRINT '"For ",m2,"kg mass,T
<wght"'t$,"Mg-T=Ma ",t$,"T=Mg-Ma
"
 110 PRINT 't$,m1,"a+",m1,"g=",m
2,"g-",m2,"a"  LET tm=m1+m2: LET
 tm2=m2-m1
 120 PRINT t$;"    ",tm,"a=";tm2,
"g"  LET s=(tm2/tm)*gr. LET s$=S
TR$ s  LET s$=s$( TO 3)
 130 PRINT t$,"     a=",tm2,"g/",
tm,"m/s",CHR$ 147'"    or a=",s$,
"m/s",CHR$ 147
 140 PRINT '"Sub in 1st equation
"
 150 PRINT 'TAB 2,"T=",m1;"a+",m
1,"g"
 160 PRINT t$,"T=",m1*tm2,"g/",t
m,"+",m1,"g",TAB 13;"or T=",m1,"
a+",m1*gr
 170 PRINT t$,"T=";m1+m1*tm,"g/"
,tm,"N",TAB 13,"or T=";m1*(VAL s
$)+m1*gr,"N"
 180 INPUT "Press ENTER-restart,
c-copy "; LINE n$
 190 IF n$<>"c" THEN GO TO 20
 200 COPY : GO TO 180
 210 REM  Graphics and screen
 220 FOR a=USR "a" TO USR "d"+7
 230 READ n  POKE a,n  NEXT a
 240 DATA 24,60,126,219,153,24,2
4,24,24,24,24,153,219,126,60,24
 250 DATA 0,0,32,0,4,0,32,0,102,
64,126,192,0,0,0,0
 260 BORDER 5  PAPER 5. INK 0. C
LS
 270 PRINT AT 0,7; INVERSE 1;"AT
TWOOD'S MACHINE"
 280 PLOT 219,144: CIRCLE 219,14
4,25
 290 PLOT 195,144. DRAW 0,-80  D
RAW 1,0· DRAW 0,72
 300 PLOT 244,144: DRAW 0,-112
DRAW -1,0  DRAW 0,102
 310 PRINT AT 6,24,CHR$ 144,"T",
AT 6,29,"T",CHR$ 144
 320 PRINT INK 1,AT 14,24;CHR$ 1
43,AT 18,30,CHR$ 143
 330 PRINT AT 15,24. INK 2;CHR$
145,AT 19,30,CHR$ 145
 340 INK 2· PLOT 179,84  DRAW 0,
40  DRAW 1,0  DRAW 0,-40
 350 PRINT AT 6,22,CHR$ 144. INK
0  PRINT AT 7,23,"a"
 360 PRINT AT 1,0,"To Find. T,a"
 370 PLOT 170,164. DRAW 0,-130
 380 RETURN
 390 REM Optional instructions
 400 RESTORE 440. PRINT 'TAB 11;
"NOTATION": LET d$=".............
........."
 410 FOR r=1 TO 5. READ r$
 420 PRINT ''TAB 3,r$(1),d$( TO
25-LEN r$),r$
 430 NEXT r
 440 DATA "Tension","acceleratio
n","gravitational accel.","Newto
n","mass"
 460 PRINT '''TAB 9,"Press any K
ey"
 480 PAUSE 0  RESTORE · RETURN
 500 SAVE "PULLEY" LINE 1  VERIF
Y ""
```

```
            ATTWOOD'S MACHINE
To Find  T,a
From Newton's 2nd
    Law, F=ma

For 2kg mass,T>wght
∴ T-mg=ma . T=ma+mg

For 5kg mass,T<wght
   Mg-T=Ma    T=Mg-Ma

   2a+2g=5g-5a
      7a=3g
        a=3g/7m/s²
     or a=4.2m/s²

sub in 1st equation

   T=2a+2g
   T=6g/7+2g   or T=2a+19.6
   T=16g/7N    or T=28N

                a   T      T
                  2gN
                           5gN
```



This way to the dump ...

Peter Whittaker explains how to set up a machine code hi-res screen dump

The Dragon's hi-resolution screen is made up of 256*192 pixels, which are organised into 192 rows of 32 bytes each. If a pixel is set on the screen, the relevant bit is set to a 1, and if the pixel is reset the bit is cleared. This format is not immediately compatible with the Seikosha Printer which prints a column of seven dots at a time. (Fig 1.)

A Basic screen dump can be written using the *PPoint*(x,y) command, but it is very slow. Machine code is much faster. Assembler #1 (memory dump #2) is a small screen dump program using little over half the printer's capability. Assembler #2 (memory dump #1) is a double sized screen dump using the printer's full width.

Instead of the *PPoint* command, we use the machine code equivalent of the *And* function. By *Anding* a register and test byte, we set only the bits in the register which are also set in the test byte, and clear all the rest. The test byte is unaffected. If we load the A register with #73 and we *And* it with #31, the test byte will still contain #31, but the A register will now contain #9 (Fig 2.)

To test *PPoint*(0,0) we load the relevant byte into A (*LdA* 1536) and *And* it with #128 (*AndA* #128). If the pixel was set, A will contain #128, otherwise A will contain a 0.

By *Anding* a column of seven bytes, we can build up a byte (@*Num*) to send to the printer. The first time through we want to set the first bit of @*Num*, and the second bit on the second pass etc. This is quite long-winded to program. It is easier to set the eighth bit each time, and to scroll all the bits one place right.

This is done using the *LsrA* command. (Fig 3.) Having moved all the bits one place right, it places a 0 in the eighth bit. Doing this seven times will move the first bit from the eighth position to the first, the second to the second etc. All we need to do is add #128 (*AddA* #128) to tell the printer that this is graphics data, and send it to the printer (*Jsr* $800F).

To loop through the column of bytes eight times, once for each bit, we need to decrease the number we are *Anding* with the bytes (@*bit*) using the *LsrA* command again. When @*bit* falls to 0, we know that we have completed that column and can move onto the next.

The next thing to check is whether or not we have reached the end of the line. Here the Dragon memory layout is very convenient. There are 32 bytes across the screen, and by *Anding* any byte address with #31 (*LdD* #1540:*AndB* #31) we discover how far across the screen we are. (Fig 4.) When the B register returns a 0, we know that we have reached the end of this line and started the next. A carriage return is sent to the printer and the pointer is incremented by 192 to move it to the start of the next block of seven lines. A check is made to make sure the end of the screen had not yet been reached, and the program continues. The last thing the program does is print a *Chr$*(15) to return to text mode.

To use the printer to the full, we need to double up the size of the screen dump. However, nothing is for free, and because the printer only prints 480 dots to a line (while 256*2pixels=512) we lose the right hand edge of the screen. The process is the same as for the small screen dump, except that we are printing each dot twice. When we scroll the bits in @*Num* the *AsrA* command is used and then the *LsrA*. This is so that the eighth bit is not cleared with the first scroll (Fig 3.) Similarly, instead of sending a column of seven pixels to the printer, we are sending three and a half, each twice. The first line of print we send pixels 1,1,2,2,3,3,4 and the second 4,5,5,6,6,7,7 and so on.

Before *Execing* these programs enter *PClear5:PMode0,5:PCls*. Remember to protect the programs with *CLear*200,32000 and to call them *Exec*32001.

PIXELS

0,0	1,0	2,0	3,0					S		1537 (address)	1535
0,1								E			1570
0,3								I			1602
								K			
								O			
								S			
								H			
0,7								A			

Byte stored by Dragon

Arrangements of pixels and bytes in dragon hi-res graphics screen memory (Fig 1)

BEFORE

@ BIT 00011111 (31)
A register 01001001 (73)
00001001

AFTER

@ BIT 00011111 (31)
A register 00001001 (9)

Fig 2. The effect of 'AND'ing two bytes

Ø → → → C

LSRA CLEARS THE 8TH BIT

→ → → C

ASRA LEAVES THE 8TH BIT

Fig 3. The LSRA & ASRA commands.

LDD # 1540

ANDB # 31

A. reg B reg

0	0	0	0	0	1	0	0

AND

0	0	0	1	1	1	1	1

↓

B register =

0	0	0	0	0	1	0	0

= 4th column of #31

Fig 4. ANDing the D. register with #31 to find position on screen.

ASSEMBLER 1. SMALL SCREEN DUMP.

```
7D01                 10        ORG  [illegible]         7D45 [illegible]          50       [illegible]
7D01 8680            20 @START  LDA  #128                7D4A B7[illegible]        [illegible] STA [illegible]
7D03 B77D89          20        STA  @BIT                7D4D 6180                 [illegible] CMPA [illegible]
7D06 8E05E0          20        LDX  #1504               7D4F 2702                 [illegible] BEQ [illegible]
7D09 BF7D89          20        STX  @POINTER            7D51 20CC                 [illegible] BRA @BIT
7D0C 860D            20        LDA  #13                 7D53 8681                 60 @BIT4  LDA #1[illegible]
7D0E BD800F          20        JSR  $800F               7D55 B77D8B               60       STA @BIT
7D11 86[illegible]   [illegible] LDA #[illegible]       7D58 BE7D89               60       LDX @POINTER
7D13 BD800F          20        JSR  $800F               7D5B 3001                 60       LEAX 1,X
7D16 8E7D89          30 [illegible]                     7D5D BF7D89               60       STX @POINTER
7D19 [illegible]     30        [illegible] @NUM         7D60 FC7D89               60       LDD @POINTER
7D1C 2680            30        LDB  #[illegible]        7D63 C41F                 60       ANDB #31
7D1E 308820          40 @[illegible] LEAX [illegible]   7D65 C100                 60       CMPB #0
7D21 A6[illegible]   40        LDA  [illegible]         7D67 26AD                 60       BNE @BIT[illegible]
7D[illegible] B47D8B 40        ANDA @BIT                7D69 BE7D89               60       LDX @POINTER
7D[illegible] 8100   40        CMPA #0                  7D6C 3089[illegible]      60       LEAX [illegible],X
7D[illegible]        40        BEQ  @BIT1               7D70 BF7D89               60       STX @POINTER
7D[illegible]        40        LDA  @NUM                7D73 860D                 60       LDA #13
7D[illegible] 8A[illegible] 40 ORA #1[illegible]        7D75 BD800F               60       JSR $800F
7D[illegible]        40        STA  @NUM                7D78 8C1E[illegible]      60       CMPX #7E[illegible]
7D[illegible] B67D8B 50 @BIT1  LDA  @BIT                7D7B 2599                 60       BLO @BIT[illegible]
7D[illegible] 44     [illegible] LSRA                   7D7D 860F                 60       LDA #1[illegible]
7D[illegible]        50        STA  @N[illegible]       7D7F BD800F               60       JSR $800F
7D[illegible]        50        DECB                     7D82 860D                 60       LDA #1[illegible]
7D[illegible]        50        C[illegible] #[illegible] 7D84 BD800F              60       JSR $800F
7D[illegible]        50        BNE  @BIT[illegible]     7D87 39                   60       RTS
7D[illegible]        50        LDA  @NUM                7D88 80                   70 @BIT   FCB 128
7D[illegible]        50        [illegible] #[illegible] 7D89 0000                 70 @POINTER FDB 0
7D[illegible] BD800F 50        JSR  $800F               7D8B 00                   70 @NUM   FCB 0
7D[illegible] B67D8B 50        LDA  @BIT                7D8C                      80       END @START
```

MEMORY DUMP #1. BIG SCREEN DUMP.

32000	[illegible]	134	128	193	125	155	142	[illegible]	204	91	25	56
32012	134	13	[illegible]	128	1[illegible]	1[illegible]4	8	189	128	15	190	125
320[illegible]	156	127	125	159	1[illegible]	3	[illegible]	[illegible]	[illegible]	56	[illegible]	[illegible]
[illegible]	[illegible]	15[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]32	12[illegible]	158	1[illegible]	12[illegible]	[illegible]
320[illegible]	1[illegible]	158	1[illegible]	1[illegible]5	152	[illegible]	[illegible]	8	12[illegible]	1[illegible]	90	1[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	4	1[illegible]	32	166	13[illegible]	189	12[illegible]	[illegible]	[illegible]
320[illegible]	[illegible]	33	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	17[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	17[illegible]
[illegible]	[illegible]	1[illegible]	[illegible]	[illegible]	[illegible]	120	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	1[illegible]	66	91	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1[illegible]	[illegible]28	[illegible]	[illegible]	[illegible]
[illegible]	0	0	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	1[illegible]	1[illegible]	[illegible]	[illegible]	12[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	175	1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1[illegible]	[illegible]
[illegible]	1[illegible]	[illegible]	[illegible]	[illegible]	1[illegible]	[illegible]	15	1[illegible]9	[illegible]	[illegible]	[illegible]	[illegible]
32204	182	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	1[illegible]	1[illegible]	1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	182	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	17[illegible]	1[illegible]
[illegible]	[illegible]	1[illegible]	[illegible]	1[illegible]	3[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	1[illegible]	[illegible]	1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

MEMORY DUMP #2. [illegible]

32000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1[illegible]	1[illegible]	5	[illegible]	11	1[illegible]	[illegible]
[illegible]	1[illegible]	1	1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1[illegible]	176	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]2036	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1[illegible]	[illegible]	[illegible]	1	1[illegible]	[illegible]	[illegible]
[illegible]	1[illegible]	68	[illegible]	[illegible]	136	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	1[illegible]	[illegible]	[illegible]	[illegible]	1[illegible]	1[illegible]	[illegible]	[illegible]	191	1[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	1[illegible]	1[illegible]	[illegible]	[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	1[illegible]	[illegible]	[illegible]	[illegible]	1[illegible]	1[illegible]	1[illegible]	13	1[illegible]	1[illegible]	[illegible]
32[illegible]20	14[illegible]	30	[illegible]	[illegible]	[illegible]	1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

EXEC 32001

The Rom approach

Alan Turnbull reveals the dark secrets of the QL ROM

One of the first things the new QL owner must surely do is examine the read-only memory (Rom) of his or her machine and find out how the whole thing works.

With the Sinclair QL, this may prove difficult as there are at least four versions of the machine in existence, code-named 'FB', 'PM', 'AH' and the latest, 'JM'.

Version 'FB' was in a sorry state with Rom bugs too numerous to mention. Version 'PM' was a vast improvement but, Sinclair said, 'AH' was to be the final Rom.

As ever true to their word, Sinclair brought out a new Rom called 'JM', which "puts right all major Rom bugs, implements multi-tasking and makes SuperBasic much faster". Apparently, all customers will be offered an up-grade to this version by a strict recall operation which involves you posting your precious QL off to Camberley, and Sinclair engineers plugging in the new Rom chips.

Meanwhile, if you are lucky enough to own the quite respectable version 'AH' (and you can find out by typing *PRINT VER$* at your console), this article may prove very useful if you want to reveal the dark secrets of the QL Rom.

The program in Figure 1 gives a tabulated 'dump of two special tables in the QL Rom. The first table, residing at address 26652 in version 'AH', lists all command keywords and their run-time module address. The second table at address 27328 lists all function keywords and their run-time module address.

Each table is held identically in the following format:

›number of entries‹

›first module address offset‹
›number of characters in first keyword‹
›first keyword‹

›second module address offset‹
›number of characters in second keyword‹
›second keyword‹

and so on.

The SuperBasic procedure *Tabulate* in Figure 1 automatically tabulates on the QL screen any table held in this format, given its start address. Suitable alteration will allow output through the serial ports to a printer.

The output from the program is shown in Figure 2 and consulting this list and looking through the Rom routines at the addresses given may reveal many secrets.

For instance, any of the commands which take zero or optional parameters, such as *Run*, *List*, *Renum*, *Pause* etc, may be called directly from SuperBasic using the Call command! For example, to list all of the current program in memory type *Call 28036*.

In fact, if you wish to call your own machine code routine in Ram from SuperBasic, you should make sure the MC68008 data register D0 holds zero before doing a RTS. Also, A6 should not be altered. It is used by SuperBasic and QDOS as a pointer, similar in function to the IY index register on the ZX Spectrum.

If D0 holds a number between 235 and 255 inclusive, the QL will use this as an error number. D0 = 235 gives *"Bad line"*, 236 gives *"Read only"* and so on up to 255, which gives *"Not complete"*.

Calling routines like *List* is of no direct benefit — just illustration. But given these Rom routine addresses, the adventurous programmer could find out how to *Load* and *Save* Microdrive files or draw ellipses from machine code.

It must be noted, however, that whilst some of the command routines may be called directly the function routines cannot. This is because the result of each function is placed in an area of Ram analogous to the ZX Spectrum's 'calculator stack', ready for picking up by the expression evaluator, and hence no return is made to the SuperBasic user.

It is hoped, nonetheless, that readers will find the routine and output presented in this article useful and that they, too, will delve into the secrets of the QL Rom.

```
100 REMark Program to tabulate routine addresses in QL ROM
110 REMark     (c) COPYRIGHT August 1984  Alan Turnbull.
120
130 MODE 512
140 CLS
150 CSIZE #0 1 1
160 PRINT #0 "Use CTRL & F5 keys together as 'toggle' to pause output."
170 UNDER 1 CSIZE 2 1 PRINT "COMMAND ROUTINE ADDRESSES" CSIZE 0 0 UNDER 0
180 PRINT
190 TABULATE 26652
200 PRINT
210 UNDER 1 CSIZE 2 1 PRINT "FUNCTION ROUTINE ADDRESSES" CSIZE 0 0 UNDER 0
220 PRINT
230 TABULATE 27328
240 CLS #0
250 PRINT #0 "Program finished o.k."
260 CSIZE #0,0 0
270 STOP
280
290 REMark Procedure to tabulate ROM table
300
310 DEFine PROCedure TABULATE(table_address)
320 LOCal padding$ number_of_entries ROM_address,entry_number offset routine_address number_of_characters keyword_character
330 LET padding$=FILL$(" ",12)
340 LET number_of_entries=PEEK_W(table_address)
350 LET ROM_address=table_address+2
360 FOR entry_number=1 TO number_of_entries
370   LET offset=PEEK_W(ROM_address)
380   LET routine_address=ROM_address+offset
390   LET ROM_address=ROM_address+2
400   LET number_of_characters=PEEK(ROM_address)
410   LET ROM_address=ROM_address+1
420   FOR keyword_character=1 TO number_of_characters
430     PRINT CHR$(PEEK(ROM_address));
440     LET ROM_address=ROM_address+1
450   END FOR keyword_character
460   PRINT padding$(1 TO (12-number_of_characters))
470   IF PEEK(ROM_address)=0 THEN LET ROM_address=ROM_address+1
480   PRINT routine_address
490 END FOR entry_number
500 PRINT
510 END DEFine TABULATE
```

Figure 1

COMMAND ROUTINE ADDRESSES

PRINT	30800	RUN	28232	STOP	28234	INPUT	28584	WINDOW	30646
BORDER	30684	INK	28364	STRIP	28380	PAPER	28372	BLOCK	30640
PAN	30486	SCROLL	29410	CSIZE	24756	FLASH	26826	UNDER	30820
OVER	26848	CURSOR	24752	AT	24586	SCALE	26180	POINT	26118
LINE	26136	ELLIPSE	26160	CIRCLE	26160	ARC	26248	POINT_R	26122
TURN	30416	TURNTO	30460	PENUP	30474	PENDOWN	30478	MOVE	30450
LIST	28036	OPEN	25926	CLOSE	25892	FORMAT	25714	COPY	25740
COPY_N	25744	DELETE	25870	DIR	25576	EXEC	25246	EXEC_W	25250
LBYTES	25360	SEXEC	25414	SBYTES	25410	SAVE	25864	MERGE	30270
MRUN	30280	LOAD	30212	LRUN	30310	NEW	30230	CLEAR	30220
OPEN_IN	25920	OPEN_NEW	25734	CLS	29002	CALL	24540	RECOL	29536
RANDOMISE	29310	PAUSE	30498	POKE	28526	POKE_W	28534	POKE_L	28540
BAUD	24200	BEEP	24368	CONTINUE	30400	RETRY	30394	READ	27080
NET	28336	MODE	28408	RENUM	29628	DLINE	30006	SDATE	27086
ADATE	24306	LINE_R	26140	ELLIPSE_R	26164	CIRCLE_R	26164	ARC_R	26244
AUTO	29502	EDIT	29578	FILL	25998	WIDTH	30624		

FUNCTION ROUTINE ADDRESSES

ACOS	30858	ACOT	30866	ASIN	30872	ATAN	30878	COS	30884
COT	30890	EXP	30908	LN	30902	LOG10	30906	SIN	30914
SQRT	30920	TAN	30926	DEG	30934	RAD	30938	RND	31018
INT	31110	ABS	30970	PI	31456	PEEK	31134	PEEK_W	31142
PEEK_L	31150	RESPR	31196	EOF	31220	INKEY$	31274	CHR$	31380
CODE	31476	KEYROW	31614	BEEPING	31200	LEN	31456	DIM$	31516
DAY$	31600	DATE	31796	DATE$	31204	FILL$	31270	VER$	31250

Figure 2


BIGGER, BOULDER, More BEAUTIFUL
AMERICAN NO 1.
75 05 00 138 000005
86 LEVELS
GET YOUR ROCKS OFF
JOYSTICK
Boulder dash
commodore 64
BOULDER DASH
CASSETTE 8·95
DISK 10·95
State Soft Ltd,
Business & Technology Centre,
Bessemer Drive, Stevenege,
Hertfordshire SG1 2DY
Phone (0438) 316561
Statesoft
Really Something Else


ANIROG
ZAGA
MISSION
This diagonally
scrolling maze game
features superb 3D
graphics brilliant sound
effects and requires 100% concentration to successfully
halicopter through unknown hazards in order to complete Zaga Missi
and liva to play another day — Commudore 64 — £7 95
Also available on Disk at £9.95
TRADE ENQUIRIES ANIROG SOFTWARE LTD 29 WEST HILL DARTFORD KENT (0322) 92513/8
MAIL ORDER 8 HIGH STREET HORLEY SURREY 24 HOUR CREDIT CARD SALES HORLEY (02934) 6083
PAYMENT BY CHEQUE P O ACCESS/VISA 50p POSTAGE & PACKAGING



THE FIRST OF THE
TRULY LEGENDARY GAMES
HERCULES
Access Principle)

Plenty of 'scope

Richard Browning (well, his program) simulates the working of an ocilloscope

This oscilloscope program is a very basic example of the effects when you place negative charges near positively charged electrons. As like charges repel and unlike charges attract, interesting effects can be made.

Program notes

- 80 — Defines oscilloscope drawing procedure
- 160 — Defines T/B plates – positive or negative for each set variation
- 260-320 — A% according to response to *Procreselect*
- 480-600 — Draws electron stream according to variation selected

```
10MODE 1
13PRINTTAB(20,7)"T"
17PRINTTAB(20,12)"0"
20PROCosc
30PROCreselect
40PROCelectrons
50GOTO30
60DEF PROCosc
70MOVE 400,400
80FOR A%=100 TO 360 STEP 5.625
90A=RAD(A%)
100DRAW 400+300*SIN(A),700+300*COS(A)
110NEXT A%
120DRAW 800,800:MOVE 400,400:DRAW 800,600
130DRAW 1050,600:DRAW 1050,800:DRAW 800,800
140GCOL0,1:MOVE 700,750:DRAW 600,750:GCOL0,2:MOVE 700,650:DRAW 600,650
150ENDPROC
160DEF PROCreselect
170PRINT TAB(0,20)"CRO T/B plates :"
180PRINT SPC(8)"TOP (+ or -) ?";:B=GET:VDUB
190PRINT 'SPC(8)"BOT (+ or -) ?";:D=GET:VDUD
200IF NOT(B=ASC"+" OR B=ASC"-" OR D=ASC"+" OR D=ASC"-") THEN GOTO 170
210IF B=ASC"-" AND D=ASC"-" THEN GOTO 260
220IF D=ASC"+" AND D=ASC"+" THEN GOTO 280
230IF B=ASC"+" AND D=ASC"-" THEN GOTO 300
240IF B=ASC"-" AND D=ASC"+" THEN GOTO 320
250ENDPROC
260VDU 19,1,3;0;A%=1
270GOTO250
280VDU 19,2,1;0;A%=-1
290GOTO250
300A%=2
310GOTO250
320VDU 19,2,3;0;19,1,1;0;:A%=-2
330GOTO250
340DEF PROCelectrons
350IFA%=-1 GOTO 380
360IFA%=-2 GOTO 400
370IFA%=2 GOTO 420
380PROCELS(725,"N")
390ENDPROC
400PROCELS(700,"Y")
410ENDPROC
420PROCELS(800,"Y")
430ENDPROC
440DEFPROCELS(H%,L$)
450IF L$<>"N" THEN GOTO 480
460MOVE 900,700:DRAW 200,700
470ENDPROC
480IF H%=700 THEN GOTO 550
490MOVE 750,700
500FOR A1=200 TO 230 STEP 5
510A=RAD(A1):DRAW 750+200*SIN(A),800+100*COS(A)
520NEXT A1
530DRAW 225,900
540ENDPROC
550MOVE 685,690
560FOR A1=355 TO 300 STEP -5
570A=RAD(A1):DRAW 725+200*SIN(A),600+100*COS(A)
580NEXT A1
585DRAW 250,475
600ENDPROC
```

Off at a tangent

Mark Cornall explains how trig functions work on the Commodore 64

These programs should help explain how microprocessors calculate values of sine, cosine and tangent, but first you need a little background information.

Before calculators came along, trigonometrical values were found by looking in books of mathematical tables Nowadays, the easiest thing to do would be to place these same tables in the machine, but this would use far too much memory Instead, they are worked out using Maclaurin's Theorem.

Maclaurin's Theorem is a complex power series, in fact you might have guessed its complexity from the time it takes a calculator to work out a simple trig function. For anyone that understands power series the numbers in the brackets in lines (program 1) 720 and 730 (2, 6, 24, 120 ..) are factorials of the powers in the same set of brackets.

The theorem only works if the angle is expressed in radians, so lines 700-710 convert the input values If you prefer working in radians, simply change line 700 to

700 Input" (CLR) Enter Angle In Radians", X

and omit line 710

Now, on a different tack, we all know that tan equals sin divided by the cos Therefore, to calculate the tan, the computer calculates first the sin, then the cos, and finally combines the two (lines 510-520, program 1) You can see that it should take longer to work out tan, because the computer must do two complicated calculations instead of one.

To prove this to yourself, type in program 2, run it, and note down the time shown by the internal clock. Then change line 40 to

40 Print Tan (0)

Run the program again and check the time Think about the results and compare them to what I've been saying

Hopefully you should now understand a little more about how trig functions work on your Commodore 64

Program 1

```
0 REM *** MACLAURIN'S THEOREM - MARK G,
1984 ***
1 POKE53280,11:POKE53281,11:POKE646,0:REM
*** SET SCREEN ***
200 INPUT"[CLR]SIN,COS,TAN (S,C,T)";A$:REM
*** GET FUNCTION ***
210 IFA$="S"THEN300
220 IFA$="C"THEN400
230 IFA$="T"THEN500
240 GOTO200
297 :
298 :
299 REM *** SIN ***
300 GOSUB 700
310 SI=X-C+E-G+I:REM *** CALCULATE SIN ***
320 PRINT"[CLR]MACLAURIN'S THEOREM SAYS:"
330 PRINT SI
340 PRINT"[CUD]THE COMPUTER SAYS:"
350 PRINT SIN(X)
360 GETA$:IFA$=""THEN360
370 GOTO200
397 :
398 :
399 REM *** COS ***
400 GOSUB 700
410 CO=1-B+D-F+H-J:REM *** CALCULATE COS ***
420 PRINT"[CLR]MACLAURIN'S THEOREM SAYS:"
430 PRINT CO
440 PRINT"[CUD]THE COMPUTER SAYS:"
450 PRINT COS(X)
460 GETA$:IFA$=""THEN460
470 GOTO200
497 :
498 :
499 REM *** TAN ***
500 GOSUB700
510 SI=X-C+E-G+I:CO=1-B+D-F+H-J:REM ***
CALCULATE SIN AND COS ***
520 TA=SI/CO:REM *** CALCULATE TAN ***
530 PRINT"[CLR]MACLAURIN'S THEOREM SAYS:"
540 PRINT TA
550 PRINT"[CUD]THE COMPUTER SAYS:"
560 PRINT TAN(X)
570 GETA$:IFA$=""THEN570
580 GOTO200
697 :
698 :
699 REM *** GET ANGLE ***
700 INPUT"[CLR]ENTER ANGLE IN DEGREE'S";A
710 X=(A*3.14159265)/180:REM *** CHANGE TO
RADIANS ***
717 :
718 :
719 REM *** DEFINE TERMS OF POWER
SERIES ***
720 B=((X↑2)/2):C=((X↑3)/6):D=((X↑4)/24):
E=((X↑5)/120):F=((X↑6)/720)
730 G=((X↑7)/5040):H=((X↑8)/40320):I=
((X↑9)/362880):J=((X↑10)/3628800)
740 RETUAN
```

Program 2

```
10 REM *** FUNCTION TEST ***
20 TI$="000000":PRINT"[CLR]"
30 FORI=1TO500
40 PRINTSIN(0)
50 NEXTI
60 PRINT"TIME=";TI$
```


HIGH SPEED
commodore
COMMODORE 64 owners, at last the long wait is over — FASTBACK allows multipart software to load around ten times faster and run independently of the utility. For example 'The Hobbit' loads in 150 seconds with FASTBACK
Supplied on tape with full instructions
ONLY £9 95
AMSTRAD
SPEEDMASTER is here. Allows choice of save speed. Approx. 2 × faster.
ONLY £7 95
TAPE TO DISK TRANSFER UTILITIES
Transfer games etc. to disk. Supplied on tape with full instructions for —
BBC £9.95
ATARI (All models) . . . £9.95
COMMODORE 64 NEW IMPROVED VERSION
DISCO
No user knowledge required
We guarantee this is the best available
Still only £9 95
All prices include VAT, Post & Packing. Cheques, PO
EVESHAM MICRO CENTRE
Bridge St, Evesham, Worcestershire
Tel: 0386 49641
NEW SHOP NOW OPEN – Micro Centre,
1756 Pershore Rd, Cotteridge, Birmingham Tel. 021-458 4564
TRADE AND OVERSEAS ORDERS WELCOME

Open Forum

Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed.

Stitcher

on Dragon

This program consists of the computer drawing dots around the perimeter of an imaginary rectangle, and then drawing lines from the four corners of the screen to the dots. An interesting 'stitched' pattern is built up as the dots are drawn. The computer does this seven times, increasing the distance between the dots by 2 pixels each time

Program notes

30 Sets inverse high resolution.
60 Increases the gap between the dots by 2 (2 pixels). If the gap is 20 then the program starts again.
90-140 Draws lines from the 4 screen corners to the top side of the rectangle
160-210 Draws lines from 4 screen corners to the left side of the rectangle
220-260 Draws lines from the 4 screen corners to the bottom side of the rectangle
290-330 Draws lines from the 4 screen corners to the right side of the rectangle

The program can be altered by returning the screen to normal high resolution in line 30 and by changing the distance between the dots by adding a greater value to 6 in line 60

```
10 REM *****STITCHER*****
20 REM **MICHAEL LAWTON**
30 PMODE 4,1:COLOR 0,5:PCLS:SCREEN 1,1
40 S=4
50 PCLS
60 S=S+2:IF S>20 THEN GOTO 370
70 A=64:B=192:C=48:D=144
80 PSET(B,A)
90 LINE(0,0)-(B,A),PSET
100 LINE(256,0)-(B,A),PSET
110 LINE(0,192)-(B,A),PSET
120 LINE(256,192)-(B,A),PSET
130 IF B<64 THEN GOTO 150
140 B=B-S:GOTO 80
150 PSET(B,A)
160 LINE(0,0)-(B,A),PSET
170 LINE(256,0)-(B,A),PSET
180 LINE(0,192)-(B,A),PSET
190 LINE(256,192)-(B,A),PSET
200 A-A+S:IF A>144 THEN GOTO 220
210 GOTO 150
220 PSET(B,A)
230 LINE(0,0)-(B,A),PSET
240 LINE(256,0)-(B,A),PSET
250 LINE(0,192)-(B,A),PSET
260 LINE(256,192)-(B,A),PSET
270 B=8+S:IF 6>192 THEN GOTO 290
280 GOTO 220
290 PSET(B,A)
300 LINE(0,0)-(B,A),PSET
310 LINE(256,0)-(B,A),PSET
320 LINE(0,192)-(B,A),PSET
330 LINE(256,192)-(B,A),PSET
340 A=A-S:IF A<64 THEN GOTO 360
350 GOTO 290
360 FQRI=1 TO 1000:NEXT I:GOTO 50
370 FOR I=1 TO 1000:NEXT I:GOTO 30
```

Stitcher
by Michael Lawton

Microradio

GW6JJN

Animated

An attempt now to catch up with some of the new software in the radio computing field. A letter received from Pinehurst Data announces a Spectrum version of the Morse Code reading program for the ZX81, that was reviewed a few weeks ago in Microradio.

Also from Pinehurst Data comes a Macro Construction and Animation program for the Spectrum. This will enable the user to create animated scenes or cartoons of up to 15 minutes duration which will certainly appeal to the amateur television enthusiasts. Contact Pinehurst Data at 69 Pinehurst Park, West Moors, Wimbourne, Dorset, for more information. I hope to review these two programs soon in Microradio

Once again, Grosvenor Software has been extremely busy with the release of three new Radio Teletype (RTTY) receive and transmit programs for the Vic20, Commodore 64 and Acorn Atom Following on from the incredible RTTY programme for the Dragon reviewed in Microradio some months ago, Michael Kerry G4BMK in the shape of Grosvenor Software, has probably done more than anyone else in making this fascinating mode of communication possible

Combined with Roger Barker of G4IDE Microsystems, who has done the same for the Spectrum, Radio Teletype is now available cheaply for the most popular machines on the market The new Grosvenor programs will be reviewed in a future Microradio, but further information can be obtained from Grosvenor Software, 22 Grosvenor Road, Seaford, East Sussex BN25 2BS

Ken Dutton of Dingwall, Ross-shire, writes asking how to get into radio computing, pointing out that he has a BBC The best advice I can offer, Ken, is to point you in the direction of RAMTOP, the radio-computing users group who deal with several micros but especially the BBC RAMTOP can be contacted at Great Billing Rectory, Great Billing, Northampton.

For those people with Sinclair micros interested in radio computing, the user group is SARUG 3 Red House Lane, Leiston, Suffolk. I must ask anyone contacting user groups to include a stamped addressed envelope to be sure of a reply The same goes for letters to Microradio, of course

Memotech users interested in radio-computing will find a sympathetic ear in the shape of Dave West, 129 Old Stoke Road, Aylesbury, Bucks, who wants to contact like-minded Memotechers.

Ray Berry GW6JJN

This series of articles is designed for radio and microcomputer enthusiasts alike If you have any queries that you want answered hints and tips to share or topics that you would like to see covered write to Ray Berry Microradio *Popular Computing Weekly* 12-13 Little Newport Street London WC2R 3LD

Open Forum

Function Keys

on Commodore 64

Page 16 of the *Commodore 64 User Manual* states "The four function keys on the right hand side of the keyboard can be 'programmed' to handle a variety of functions. They can be defined in many ways to handle repetitive tasks." Further scrutiny of the user manual and also the *Programmer's reference guide* show that this is untrue much to my and many other programmers dismay.

But with this utility all those promises come true! A total of 12 function keys may be defined. The first four are the function keys on their own, the second four are with the *shift* key depressed and the last four are with the *commodore* key depressed. A maximum of 15 characters may be assigned to each key.

If the assigned function is a direct command then it will need a carriage return following it. To add one, press the f1 key after the command in quotation marks. If the command contains quotation marks these may not be typed in directly, but must be replaced by the f3 function key control character.

Data for the defined functions (sample) are in lines 220-240. The first data string is for f1, the second f3, the third f5 and the fourth f7, next the *shifted* function keys, and finally the function keys with the *Commodore* button depressed.

Program notes

130-148 M/c data.
150-165 Loads m/c into memory
170-180 Activates interrupt.
185-195 Clear memory for functions.
200-240 Data for functions.
250 Reads functions into memory

```
100 REM ****************************
105 REM ***** FUNCTION KEYS *****
110 REM ****************************
115 REM * BY GIDEON SUMMERFIELD *
120 REM ****************************
125
130 DATA 165,197,197,251,240,12,133,
    251,162,4,221,59,196,240,5,202,208
135 DATA 240,76,57,196,173,141,2,41,3,10,
    10,133,252,202,138,24,101,252
140 DATA 10,10,10,10,170,160,0,189,75,196,
    153,119,2,232,200,192,15,208
145 DATA 244,152,133,198,76,0,0,4,5,6,3,
    169,196,141,21,3,169,0,141,20,3,96
150 A=50176 D=A+74
155 FORB=ATOD
160 READC:POKEB,C
165 NEXTB
170 POKEA+58,PEEK(788)
175 POKEA+59,PEEK(789)
180 SYS(D-10)
185 FORI=1TO192
190 POKED+I,0
195 NEXTI
200
205 REM 'F1' ('■') = 'RETURN'
210 REM 'F3' ('■') = 'QUOTATION MARK'
215
220 DATA"LOAD■,1,1■ ,'LIST■"
225 DATA"RUN■","LOAD■■,8■"
230 DATA"LIST-250■","?FRE(0)■"
235 DATA",,,,,,,,","————————"
240 DATA"PEEK(","PRINT■","MID$(","THEN"
245
250 FORK=0TO11
255 READA$
260 FORE=1TO15
265 S$=MID$(A$,E,1)
270 IFS$=""THENS=0:GOTO280
275 S=ASC(S$)
280 IFS=133THENS=13
285 IFS=134THENS=34
290 POKE50250+E+K*16,S
295 NEXTE
300 NEXTK
```

Function Keys
by G Summerfield

Arcade Avenue

It's official

The whole question of arcade copies on home micros is vexed. Many large companies have made their vital initial funding and reputation from rehashed *Pacman* clones, yet the criticism is often heard these days that such unoriginal releases alienate the consumer and hurt the industry. Personally I doubt this (despite the plethora of average *Pengo* games on sale) because I appreciate the chance to sit and play a good implementation of my favourite games at home.

American software companies have usually concentrated on releasing 'official' versions of arcade games which are licenced, and sometimes programmed by, the company that produced the original. The ones that have appeared over here have had two things in common — they were very high quality and very expensive, so much so that Atari or Commodore owners would think twice before buying. However, recently there have been a few important developments in this area.

The recent action by Activision against Microdeal for copying their *Pitfall* game must have caused a flutter of worry amongst British software writers. If, for example, Williams wanted to press their rights to the *Defender* game they could make a case against Romik, Crystal, Softek and Acorn soft.

Until now these companies have been safe, and have even provided a service of sorts, because the people with the licence have not been interested in the UK software market. But now we have Atarisoft with their good conversions for, amongst others, the BBC and the Spectrum, which come in at almost three times the usual price for games in this country. In addition Parker Brothers will soon be releasing ROM cartridge 'official' arcade games for the Spectrum. Again they will be extremely good, but will cost around £20.00.

Whilst on the subject, copying from the arcades is not the only current sensitive area. I know that Software Projects have been bemused, to say the least, by the proliferation of *Manic Miner* clones. There is no doubt that early offerings like *Blagger* from Alligata or *China Miner* from Interceptor owed most of their game concept to Matthew Smith, but how can you decide when an idea changes sufficiently to become original?

There is no doubt that *Son of Blagger* with its multi-screen levels, and the superbly colourful and musical *Arabian Nights* from Interceptor, are very worthwhile games in their own right.

Tony Kendle

The Arcade Corner is a new section for anyone who enjoys playing arcade games. If you have any comments, from playing tips on difficult games or programs you'd particularly like to praise (or blame!) then write to Tony Kendle, Arcade Avenue, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 3LD.

Converter

on BBC

This is a program which will convert Decimal, Hexadecimal and Binary numbers from one base to another, and would be very useful for people studying 'O' level mathematics or computer studies.

When the menu has been displayed you simply enter the number of the conversion routine required (1-6) and then the actual number (in whichever base you are starting from.) All the hexadecimal number should be entered as 4 digits — including leading zeroes but the 16bit binary numbers will be filled with leading zeroes automatically.

The largest number the program can currently handle is 65535 but this could be altered with a bit of care.

```
5  REM "CONVERTER" written by A.FENNELL
10 CLS:MODE 7:B$="ABCDEF":DIM A(4)
20  PRINT:PRINT:PRINT:PRINT CHR$(141);"
   CONVERTER"
30  PRINT CHR$(141);"          CONVERTER"
35  R$=INKEY$(300):MODE 1:COLOUR 2
36  VDU 23,240,0,28,6,126,126,6,28,0
40 CLS:P$="":C$=""
50 PRINT:PRINT "1...DEC";CHR$(240);"HEX":
   C$=C$+"DH"
60 PRINT:PRINT "2...HEX";CHR$(240);"DEC":
   C$=C$+"HD"
70 PRINT:PRINT "3...DEC";CHR$(240);"BIN":
   C$=C$+"DB"
80 PRINT:PRINT "4...BIN";CHR$(240);"DEC":
   C$=C$+"BD"
90 PRINT:PRINT "5...HEX";CHR$(240);"BIN":
   C$=C$+"HB"
100 PRINT:PRINT "6...BIN";CHR$(240);"HEX":
   C$=C$+"BH"
110 PRINT:INPUT Q
120 IF INT(Q)<1 OR INT(Q)>6 THEN GOTO 40
130 PRINT:PRINT "INPUT THE NUMBER":INPUT Q$
140 CLS:GOSUB (500+(Q-1)*500)
150  IF P$="" THEN R$=INKEY$(300):GOTO 40
160 GOSUB 4000
170 GOTO 40
500 IF VAL(Q$)>65535 THEN PRINT: PRINT
    "NUMBER TOO LARGE":RETURN
510 A=VAL(Q$)
520 A(1)=INT(A/4096)
530 A(2)=INT((A-A(1)*4096)/256)
540 A(3)=INT((A-A(1)*4096-A(2)*256)/16)
550 A(4)=INT(A-A(1)*4096-A(2)*256-A(3)*16)
560 P$=""
570 FOR I=1 TO 4
580   IF A(I)>9 THEN A(I)=A(I)-9:A$=MID$(
    B$,A(I),1):GOTO 600
590   A$=STR$(A(I))
600   P$=P$+A$
610   NEXT I
620 RETURN
1000 IF LEN(Q$)>4 THEN PRINT:PRINT "TOO LONG
     ";Q$:RETURN
1010 IF LEN(Q$)<4 THEN PRINT:PRINT "TOO SHORT
     ";Q$:RETURN
1020 FOR I=1 TO 4
1030   S$=MID$(Q$,I,1)
1040 IF ASC(S$)<48 OR ASC(S$)>70
     THEN PRINT:PRINT "INVALID CHARACTER
    ";Q$:RETURN
1050 IF ASC(S$)>57 AND ASC(S$)<65 THEN PRINT:
      PRINT "INVALID CHARACTER ";Q$:RETURN
1060  IF ASC(S$)>64 THEN A(I)=9+(ASC(S$)-64):
      GOTO 1080
1070   A(I)=VAL(S$)
1080   NEXT I
1085  J=1:A1=0
1090 FOR I=4 TO 1 STEP -1
1100    A=A(I)*(16^(J-1))
1110    A1=A1+A
1115    J=J+1
1120   NEXT I
1125  P$=STR$(A1)
1130 RETURN
1500 IF VAL(Q$)>65525 THEN PRINT:PRINT
     "NUMBER TOO LARGE ";Q$:RETURN
1505  A=VAL(Q$)
1510  DATA 32768,16384,8192,4096,2048,1024,
     512,256,128,64,32,16,8,4,2,1
1520 A$=""
1525  RESTORE 1510
1530 FOR I=15 TO 0 STEP -1
1540   READ B:A1=INT(A/B)
1550   IF A1=0 THEN A$=A$+"0":GOTO 1570
1560   A$=A$+"1":A=INT(A-(A1*B))
1570    NEXT I
1580  P$=LEFT$(A$,8)+" "+RIGHT$(A$,8)
1590 RETURN
2000 IF LEN(Q$)>16 THEN PRINT:PRINT "WRONG
      LENGTH ";Q$:RETURN
2010 DATA 32768,16384,8192,4096,2048,1024,
     512,256
2015  DATA 128,64,32,16,8,4,2,1
2016  RESTORE 10
2020  A=0:L=LEN(Q$):IF L<16 THEN L=16-L:
     FOR I=1 TO L:Q$="0"+Q$:NEXT I
2030  FOR I=1 TO 16
2040    READ B
2045    IF MID$(Q$,I,1)<>"0" AND MID$(Q$,I,1)
      <>"1" THEN PRINT:PRINT "INVALID
      CHARACTER ";Q$:RETURN
2050   IF MID$(Q$,I,1)="1" THEN A=A+B
2060   NEXT I
2070 P$=STR$(A)
2080 RETURN
2500 IF LEN(Q$)<>4 THEN PRINT:PRINT " WRONG
     LENGTH ";Q$:RETURN
2510 GOSUB 1020
2520 IF P$="" THEN RETURN
2530 Q$=P$:P$=""
2540 IF VAL(Q$)>65535 THEN PRINT:PRINT
      "NUMBER TOO LARGE ";Q$:RETURN
2550 GOSUB 1500
2560 RETURN
3000 IF LEN(Q$)>16 OR LEN(Q$)<1 THEN PRINT:
     PRINT "WRONG LENGTH ";Q$:RETURN
3010 GOSUB 2010
3015  IF P$="" THEN RETURN
3020 Q$=P$:P$=""
3030 GOSUB 510
3040 RETURN
4000  PRINT:PRINT
4010  PRINT:PRINT Q$;MID$(C$,(Q-1)*2,1);
      " EQUALS"
4015  PRINT:PRINT P$;MID$(C$,Q*2,1)
4020  PRINT:PRINT "PRESS ANY KEY TO CONTINUE"
4030  INPUT R$
4040  RETURN
```

Converter
by A Fennel

Tony Bridge's Adventure Corner



A unique game

Nick Walkland who I mentioned in last week's Corner, wrote to me to say that he had won a Commodore 64 in Yorkshire TV's *The Game* — congratulations, Nick, it just shows what reading the corner can do for you.

Unfortunately, he's not too impressed with the adventures he's loaded into it, finding *Heroes of Khan* and *Rings of Power* both dull and slow "Can anybody recommend a decent C64 adventure?" he asks. Nick, there are many American programs available, most of which are of a high standard. One problem, however, is that a disc drive is almost essential in order to enjoy them! If you can stretch your budget to this, you'll find no better place to start than the *Zork Trilogy*, from Infocom, which has just been released by Commodore at a very attractive low price (and, if you acquire a disc drive, buy, beg or borrow a copy of Microsoft's *Flight Simulator II*). It's a pity that you have completed so many home-grown adventures on the Spectrum, as many of the best ones, for instance, the Level 9s, are also available for the Commodore, and would be an automatic recommendation.

On to my main subject this week — "The Ice Crown has been destroyed. Victory to the Free!" or, alternatively, "Ushgarak has fallen! Victory to the Free!" If you're wondering what all this is about then you are not of the fortunate band of *Lords of Midnight*. This is the adventure-strategy game from Beyond which is doing so well in the software charts.

The Grand Elf has had many letters about this wonderful game. Two came in the same post from the first people to let me know of their success in finishing L of M — the first was from Steve Baker of Leicestershire (postmarked 7.45pm, 9 July), and the second was from Dean Beale of Tamworth, who asked: "Am I the first?" Dean's letter was postmarked 9.10am, 9 July, so yes, Dean, you are the first to let The Grand Elf know. At about the same time came the news that four people had contacted Beyond — you'll remember that there is a unique competition open to Midnight players. At each step along the way to finishing the game the present screen may be dumped to a printer, and the resulting pictorial record used in the first truly computer-generated "novel".

There are two ways of achieving success in *LOM* — by setting forth with your character Morkin in an adventure-quest to destroy the Ice Crown, which is resident in the Tower of Doom, and which is the source of Doomdark's power. Or the player can aim for a strategic victory, and seize the Citadel of Ushgarak, north of the Plains of Despair, from whence Doomdark controls his evil forces.

Dean doesn't reveal his method, but Steve took the citadel with his force of six thousand men — it took him 390 days of game time. There is an interesting division over which is the easier method. The majority of people seem to find the "adventure solution" easier, but there is a growing band who seem to revel in the more taxing "military" game. Actually most players will probably find, like Richard Alexander of London SW20, that a combination of the two is the best approach — as the game progresses, one or other of the two prongs of attack will become stronger and dictate the course of events. The best strategy is, I believe, to send Morkin off on his quest, while keeping the Forces of Doomdark busy in other parts.

But let me hand you over to David Harrison of Burgess Hill in West Sussex:

"After 403 days, since the War of the Solstice began, the Lords of Xajorkith, Ithrorn, Dregrim, Whispers and Athoril, with the Utarg of Utarg and Thimrarth the Fey, stormed the Citadel of Ushgarak, defeating Doomdark's evil hordes.

"The Lord of Midnight is freed from the oppressive grip of the Dark Lord. However, Doomdark himself escaped on a steed, black as midnight, on Solstice tide to Icemark, a land North-East of Midnight.

"All had seemed lost when Morkin, son of Luxor, and heir to the Land of Midnight, was slain in battle while carrying the Ice Crown. Fawkrin the Skulkrin survived to journey south with the sad news to the Citadel of Xajorkith, under siege for many days. On hearing the fateful tidings Luxor's wrath was released upon the foul hordes of the night. The Moonprince himself led a victorious assault on the armies surrounding the Citadel.

"Over the following 200 days, the Lord of Xajorkith, with an army of 2000 warriors and riders secured the Land of Midnight, south of the Mountains of Ithril.

"Gradually, the Ice-fear weakened. Finally Xajorkith took command of three of the largest armies of his Citadel and marched North-East, to recruit the Lords of Dregrim, Whispers and Ithrorn. Night and day, the armies of the Free marched Northwards, the Ice fear growing as it bent its wrath upon them, until they reached the frozen wastes to the north of Midnight. Now they journeyed west to the Mountains of Death and sheltered in the Tower of Doom, from where, almost a year ago, Morkin had taken the Ice Crown.

"After resting, Xajorkith led the first assault on the Citadel of Ushgarak. However, the armies of Doomdark rallied to defend their Dark Lord.

"Finally, on the four hundredth day of the War of the Solstice the Plains of Death and of Despair were cleared of the Evil foe, and the Lords of Midnight sheltered in the Keep of Despair while they were utterly invigorated. Four hundred and three days had passed since the War began, when Xajorkith led the final assault — the forces of Darkness were routed, and Victory went to the Free."

I hope David's experiences have whetted your appetite for this unique game. As Steve Baker said in his letter:

"This game is probably the best I have ever played on a computer: it contains all the elements of a world-beater."

Next week, I'll be giving you some hints n' tips on playing *Lords of Midnight* but in the meantime, look at Phil McDonald's article in the August issue of *Micro Adventurer* for more information.

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So if you have an Adventure you want reviewed or if you are stuck in an Adventure and cannot progress any further write to Tony Bridge, Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

Adventure Helpline

Going bananas? If you are stuck in an Adventure with nowhere to turn do not despair — help is at hand.

Fill in the coupon explaining your problem, send it to us and a fellow adventurer may be able to help.

Remember — the system only works if those adventurers who have solved the puzzles get in touch. Every week is Save An Adventurer Today (SAAT) week!

Adventure .... on (micro) ....

Problem ....

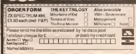
....

Name ....

Address ....


A commendably strong plot and a pot full of puzzles
—BIG K
Full marks
—C&VG
100% – the best I have ever reviewed
—PCT
TEMPLE of VRAN
THE FINAL MISSION
48
A stimulating adventure
—SINCLAIR USER
Heartly recommended'
—CRASH
'Very professional a very polished adventure
—PCW


A VIDEO RECORDER
WHEN YOU BECOME BRITAINS 'BEST ADVENTURER'
KET is a strife torn land which has never known peace Particularly vicious attacks from beyond the mountains now threaten its very existence and the Lords of Ket look upon you as their only hope
Each episode of the Ket Trilogy hides a short part of a sentence that is only revealed on completing the adventure Having come to the end of this mammoth 120K challenge, the first person to discover the complete message will be awarded a video recorder of their own choice (up to value of £400) and the coveted award BRITAINS BEST ADVENTURER
See Us at The Personal Computer World Show 19-23 Sept


ORDER FORM
ZX SPECTRUM 48K
£5.50 each (incl P&P)
THE KEY TRILOGY
Mountains of Ket
Temple of Vran
The Final Mission
Also available
1984 – Government Management
Millionaire
Splat
Please send me the titles as indicated by 1st class post
I enclose cheque for £ or debit my credit card
Access Visa Barclaycard
Name/address
INCENTIVE SOFTWARE LTD 54 London Street Reading RG1 4SQ, England


We're the duplicators that won't treat you like the next customer
Yes, we're experts in the business of data duplication both in disc and cassette format. But that doesn't mean we treat our customers like duplicates too! What Micro Byte also does extremely well is to consider the special needs of each individual customer
For a short run or full scale production Micro Byte has the capacity (over 120,000 cassettes and 18,000 discs a week in fact) to give you the quality results you're looking for – time and time again
With years of experience in this field and backed by the most efficient high-tech equipment, you can rely on us to deliver the goods within a speedy 7-10 working days. Both our duplicating service and our full printing and packaging service are so competitively priced, they won't give you any recurring nightmares!
Now you know a bit about us perhaps you'd like to make yourself our next customer and feel the benefits of our special personal service.
Douglas Brotchie will be pleased to answer any individual requirements
MiCRO BYTE
MICRO BYTE DUPLICATIONS LIMITED
All duplicators aren't the same!
Micro Byte Duplications Limited
HISOFT PASCAL
DEVPAC
Quality ZX SPECTRUM Software
HISOFT PASCAL 4T
HISOFT DEVPAC 3
Prices
Hisoft Pascal 4T (ZX SPECTRUM) £25 inclusive
(NewBrain SHARP MZ700 etc) £35 plus VAT
Hisoft DEVPAC 3 (ZX SPECTRUM) £14 inclusive
(NewBrain £25 inclusive)
HISOFT
180 High Street North
Dunstable
Beds LU6 1AT
NOW 3RD GREAT YEAR!
HIRE
SPECTRUM
ZX81 and
COMMODORE 64
TAPES
HUGE RANGE!
ADVENTURE GAMES
ARCADE and SIMULATION GAMES
BUSINESS and PRACTICAL PROGRAMS
UTILITIES
M/c COMPILERS
EDUCATIONAL
FREE
ILLUSTRATED QUARTERLY MAGAZINE WITH TIPS, NEWS, REVIEWS
DISCOUNT OFFERS
OVER 3,000
SPECIAL OFFER!
YOUR FIRST TWO TAPES FREE
IF YOU USE THIS COUPON!
To SOFTWARE LIBRARY Farnham Road West Liss Hants GU33 6JU
NAME
Machine
ADDRESS
THE ORIGINAL SOFTWARE LIBRARY!
Special offer from this issue LIFE MEMBERSHIP £5

Peek & Poke



Over heated Spectrum

B Bennett of Burnley, Lancs, writes

Q **Could you please tell me the best way to prevent my Spectrum 48K from overheating. After about two hours use, the base of the computer gets really hot and I feel it could do some damage.**

A The Spectrum is actually designed to get a 'hot bottom'. There is a flat metal plate (called a heat sink) inside the case which produces this effect. The amount of heat produced is not normally very high (you can't fry an egg on it), but is increased if you have your machine sitting on a carpet whilst it is operating

Quite honestly, if your machine is working OK after two hours of use I would think that you have little to worry about.

For the beginner

Christopher Thomas of Chester writes:

Q **On some games for the Spectrum there are user defineable keys. Could you tell me if it is possible to use a Kempston joystick with these and if so how? Also, which is the best book on machine code for the beginner?**

A Unfortunately, there is no method that is easily explainable of converting games to utilise Kempston joysticks. Although many games are Kempston compatible, there are probably more that aren't. It would be nice if all software houses offered the same options as does Ultimate (in *Atic Atac*) for example. Their software offers a choice of keyboard, or Kempston or Interface 1.

The answer to your second question may be familiar to regular readers, it is *Spectrum Machine Language for the Absolute Beginner*, published by Melbourne House

Zero line number

E Regan of Fleetwood, Lancs, writes.

Q **I own a 48K Spectrum, and am writing a program involving a zero line number. I would like to know the *Poke* that produces this, and reverses this process.**

A *Poke (PEEK 23635 + 256 * PEEK 23636) — 1,0*

This rather complex statement will convert the line number of the first Basic statement in your program to 0

By setting the second parameter of this *Poke* to 1, you will create an editable line 1 instead.

Who sells it?

S Perkins of 33 Lister Street, Willenhall, West Midlands, writes

Q **Please could you tell me the address of anybody who sells the Spanish game *Escalador Loco*? I have been everywhere and can't find a shop that sells it.**

A Escalador Loco is a Spanish game that is sold in this country under the name of *Jump for your life* by Unique. Their address is 16 Thorney Lane, South Iver, Bucks. This game was reviewed in *PCW*, 13 September

Machine ability

Peter Hohnen of Humlebaek, Denmark writes

Q **I am thinking of buying a 32K Rampack for my 16K Spectrum. Could you please tell me of the pro's and con's compared to the factory upgrading? Will it reduce the machine's ability in any way?**

A Personally, if I were you I would take the Rampack option for one good reason. If you are an overseas mail order client, your contact with your supplier is likely to be even more fraught than usual. As long as you can buy your Rampack from your local dealer, then you should have no problems

Using a Rampack will not in itself reduce the machine's capabilities in any way. You may have trouble in connecting other devices to your Rampack, but that is something else you can check if you 'see before you buy'

Graphic problems

F Holgate of Manchester writes:

Q **Can you please help me before I throw my Vic20 out of the window? I have had my Vic three weeks now, and I cannot for the life of me discover how to produce the graphic characters I see in listings.**

I cannot find reference to these in my books and as a beginner am getting frustrated to say the least. I do hope you can help me

A If you press the shift key and a letter key at the same time a graphic symbol will appear on the screen. By making a note of which symbol appears for each shift/letter combination you should be able to overcome your difficulty

Confirmed Issue 3

Roberto Gorrara of London, writes:

Q **I have been told that I have an *issue* 3 Spectrum. How can I confirm this? Also, will my machine work with a monitor?**

A *Print in 16602* will give the answer 191 if you have an issue 3 machine (it gives the answer 255 for issues 1 and 2).

Your machine will work with a monitor, but only if the monitor has the correct interface

Amstrad support

D Scowrofe of Rossendale, Lancs writes:

Q **I am considering buying an Amstrad CPC64 and would like to know more about its software support.**

I would be grateful if you if you could tell me if any of the better software houses will be writing or converting software for this computer

A Early indications are that a large number of programs currently available on the Spectrum will be appearing in Amstrad guises. Some Spectrum games have already appeared (*Codename Mat* for one) and Software Projects are known to be converting *Jet Set Willy*

It is likely that the amount of software available for this machine will depend on how many are sold, and as the sales figures so far look encouraging, I guess that the current trickle of releases will turn into a flood.

A long search

R C Jones of BFPO 25 writes

Q **I bought a Microprofessor MPF-II last year as I understood it would run Applesoft programs. As I have been unable to find any software or literature for this type of computer, I wondered if you could assist me?**

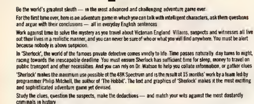
A My contacts in the publishing world have drawn a blank, I am afraid. It seems as though you may have a long and possibly fruitless search. (That is, of course, unless someone out there knows different?)

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Phil Rogers and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke*, *PCW*, 12-13 Little Newport Street, London WC2R 3LD



MICROMEGA
3D Multi-screen Rescue Mission on the 48k Spectrum — £6.95
User-definable keys, Kempston, Cursor and Sinclair joystick compatible.
BRAXX BLUFF
Selected titles available throug
larger branches
John Menzies
Spectrum
WOOLWORTH
W.H.SMITH
Our ultimate 3D program — th screen mission to save the dying crawler crew trapped at Braxx Bluf Undock and land, walk in search of the crawler, drive it through the marsh the ruins and the desert — one track wrong and you are dead! — skim the rocky seas at top speed . . . the natives are after your energy, but caution costs time and the crew are dying. There never was a cockpit-view mission like the one to Braxx Bluff!
ALSO JUS OUT
3D DEATHCHASE
3D CODENAME MAT
3D FULL THROTTLE
Kentilla

Challenging, sophisticated, advanced, extra special.



Be the world's greatest sleuth — in the most advanced and challenging adventure game ever.

For the first time ever, here is an adventure game in which you can talk with intelligent characters, ask them questions and argue with their conclusions — all in everyday English sentences.

Work against time to solve the mystery as you travel about Victorian England. Villains, suspects and witnesses all live out their lives in a realistic manner, and you can never be sure of who or what you will find anywhere. You must be alert because nobody is above suspicion.

In 'Sherlock', the world of the famous private detective comes vividly to life. Time passes naturally, day turns to night, racing towards the inescapable deadline. You must ensure Sherlock has sufficient time for sleep, money to travel on public transport and other necessities. And you can rely on Dr. Watson to help you collate information, or gather clues.

'Sherlock' makes the maximum use possible of the 48K Spectrum and is the result of 15 months' work by a team led by programmer Philip Mitchell, the author of 'The Hobbit'. The text and graphics of 'Sherlock' makes it the most exciting and sophisticated adventure game yet devised.

Study the clues, question the suspects, make the deductions — and match your wits against the most dastardly criminals in history.

Melbourne House makes the choice of your next computer adventure elementary.

A real adventure!

☐ Please send me your free catalogue
☐ Please send me Spectrum 48K Sherlock @ £14.95

All Melbourne House cassette software is unconditionally guaranteed against malfunction.

I enclose my cheque/money order for £ ______ £

Please debit my Access Card No ______ Expiry Date ______ £ + p/p 80

Signature ______ Total

Name ______ £

Address ______

Postcode ______

Orders to
Melbourne House Publishers,
39 Milton Trading Estate
Abingdon, Oxon OX14 4TD

Correspondence to:
Church Yard
Tring
Hertfordshire HP23 5LU

Access orders can be telephoned through on our 24-hour ansafone (0235) 83 5001

All prices include VAT where applicable. Please add 80p for post and pack.
Trade enquiries welcome

PHP3/9


M

Now your Commodore 64 is a robot or a synth. It's processing words, painting pictures & doing maths in machine code. It's teaching you, taking you on an adventure & using its brains ...All because you've read a book.

Sunshine books make your Commodore mean more.

Start building your library today:

Use this order form to buy the best books available for your Commodore 64
Please send me the books indicated on this form.

- [ ] I enclose a cheque/postal order for £______ payable to Sunshine Books.
- [ ] Please charge my Access Card No. ______

Signed: ______
Name: ______
Address: ______

- [ ] Please send me your free Sunshine Microcomputer Books catalogue

Send this order form with your cheque or postal order to Sunshine Books, 12/13 Little Newport Street, London WC2R 3LD
Phone orders, call 01-437 4343 and charge to your Access | Barclaycard
Computer dealers: Ring our dealer enquiry line on 01-437 4343.

- [ ] **The Working Commodore 64 £5.95** A library of practical subroutines.
- [ ] **Commodore 64 Machine Code Master £6.95** A library of machine code routines
- [ ] **Graphic Art for the Commodore 64 £5.95** Techniques for high resolution graphics.
- [ ] **Commodore 64 Adventures £5.95** A guide to writing and playing adventures.
- [ ] **Mathematics on the Commodore 64 £5.95** Essential routines for programming.
- [ ] **Business Applications for the Commodore 64 £6.95** Write your own business programs.
- [ ] **Advanced Programming Techniques on the Commodore 64 £5.95** Powerful ideas and applications.
- [ ] **Programming for Education on the Commodore 64 £5.95** A handbook for primary education
- [ ] **Artificial Intelligence for the Commodore 64 £6.95** Make your micro think.
- [ ] **DIY Robotics and Sensors for the Commodore 64 £6.95** Practical projects for control applications.
- [ ] **Machine Code Graphics & Sound for the Commodore 64 £6.95** Easy to load routines and ideas.
- [ ] **Machine Code Games Routines for the Commodore 64 £6.95** A guide to creating top quality games. Published June 1984
- [ ] **Building with Logo on the Commodore 64** Creative use of the language. Published May 1984
- [ ] **Commodore 64 Disk Companion £7.95** Essential routines for the Commodore disk users. Published May 1984

CLASSIFIED

Semi-display — £6 per single cc
Lineage — 25p perword

CALL *DIANE DAVIS* ON 01-437 4343 FDR SEMI/DISPLAY ADVERTISING

ACCESSORIES

PRINTER PRICE BEATERS!!!

Quendata 11/2 Daisywheel ONLY £230 (Incl)
Quendata Dot Matrix ONLY £180 (Inc)
Quendata Typewriter/Printer ONLY £380 (Incl)

PLUS
Wheels and Ribbons at *LOW LOW PRICES*

SOUTHERN SOFTWARE
4 Priory Road,
Maidstone Kent

Telephone
(0622) 51736/56376

P S Have you discovered our Educational Software yet?

PROGRAMMERS — We pay top royalties for good programs — advertise greater educational

BLANK CASSETTES
C10 £2.95 for 10 £23 for 100
C15 £3.05 for 10 £22 for 100 inc. p+p
FULLY GUARANTEED
Send cheque/PO to
B.R.P
368 Mile End Road
London E3 4QS
Tel. 01-980 1188

SPECTRUM KEYBOARD/ WORKSTATIONS
To clear £30.00 + £2.5 p p
Single entry extended make and delete keys full length space bar
As advertised in Sinclair user
40 only available — send cheque/PO payable to Force Astro Ltd Shaw House Melksham Wilts SN12 8EE. Tel 0225 702730

SUPER JOGGERS!
Our super new full colour high-tech pro-gramming charts that make the manual redundant!
Each chart colour fully displays all the information that has to be referred frequently accessed. They make on sheet present. Available for ZX Spectrum, BBC Elec tron CBM64
Phone for details now or send cheque/ P O for £1.20 to
SIDERSOFT
Freepost, P O Box 64
Ilford, Essex IG1 1BR.
Tel 01-478 1291
(10am-7pm)

Self Adhesive Cassette & Disk Labels

CASSETTE LABELS On A4 above 12 labels per sheet, 100 labels £3.00 1000 £21.85
Rolls of 500 labels, on tractor feed backing paper for overprinting by computer printer White £14.88. Tints available Buff Yellow Pink Green Orange or Grey £16.90.
DISK LABELS Rolls of 800 labels, on tractor feed paper White £12.75, Tinted £10.92

The above prices are VAT & carriage inclusive
For our full price list and sample brochure
Telephone (0795) 28425 (24 hrs.)

INDUSTRIAL PROCESS
Self Adhesive Labels SUPERFAST
Unit A8 Smead-Dean Centre Eurolink Way
Sittingbourne Kent ME10 3RN

BLANK CASSETTES
15 C15's for £3.65 100 for £26.50
10 C15's for £3.85 100 for £25
10 C20's for £4.00 100 for £27.30
FULLY GUARANTEED inc P&P
C.O.D. add 50p Immediate Despatch
U.K HOME COMPUTERS
60 Churchward Ave, Swindon, Wilts.
24 Hr Order Phone 0793-[illegible]

BLANK DISKS SPECIAL OFFER

5 cms. 5¼" single sided double density
Supplied in boxes of 10
Prices include V.A.T
1–9 boxes ... £18.96
10–20 boxes ... £15.95
Please send cheque/P O to
**S.J.B Disk Supplies,
11 Oundle Drive,
Woollaton Park,
Nottingham NG8 1BN**

DESIGNER dust covers. Soft P V C Spectrum £1 95 Cmdr £2 95 BBC £3.95 inc p & p Dream covers Lowbury Stoke St Gregory Taunton Somerset TA3 6JA

R.P.M. SPECTRUM JOYSTICK INTERFACE

Interface £9.95
Joystick £7.50
Joystick and interface £1[illegible]
R.P.M. BLECS.
273 Padiham Rd.
Burnley
Lancs. BB12 6BZ

UTILITIES

Q.L. UTILITIES
4 programs on microdrive for Sinclair Q L to prevent DI Rectory overflowing the screen, provide single key L O A Ding or D E L E T ion of files repeat F O R M A T ing of cartridges and back up C O P Y ing of whole or part of a cartridge £10 from

W D SOFTWARE
Hilltop,
St. Mary,
Jersey
Channel Islands
Tel (0634) 81392.

MICRODRIVE ONE (MD1)

WE OFFER ON ALL OUR PRODUCTS A FULL MONEY BACK GUARANTEE an update service and FULLY detailed instructions with USER friendly programs Match that!

YES AT LAST 48K Spectrum owners with m/drive can NOW transfer the MAJORITY of their cassette programs to m/drive (inc headerless, long programs + those with LOW addresses — say 16384) and get sited running

OUR TC5 program includes the bytes + sited + always to m/drive at £5.95 but MD1 has 5 programs HELP YOU get sited running + 2 "CAT" housekeeping programs. Includes program analyser also programs that produce the reader you need. All our programs reviewed have received max 5 stars (incl **GRAPHICS toolkit £5.50**) Introductory price £6.50 inc p/p OVERSEAS customers and £1 Europe £2 others for each product. Send SAE [illegible]

LERM Dept WE1, 10 Brunswick Gdns, Corby Northants

Q.L. UTILITIES
FILE UTILITY PROGRAM

Professional scrolling directory with file length copy complete cartridge, single key multiple copy and delete full wildcard selector copy and delete print directory, print file block wastes max single key multiple format, verify file.
BOOT PROGRAM
Professional loading directory with file length Single key load or run.
£8.50 + 35p p&p for 1000
N. STRATHERN, 174 Richmond Rd
London E8

MEMBRAIN Software

1 Utilities for Memotech S09/512 Features scroll keys load, verify free memory DOKE, dec-hex, dec-bin block fill whole dump (as ASCII chars) high + low res. Screen dumps. £10 only

2 Screen dump for high/low res. uses function keys. £10 only or £15 for both. Specify UTILITIES or DUMP and allow 21 days. Make cheque P O to S Varley Send order to 26, High Road, Redworth, Newton Aycliffe Co Durham.

CLASSIFIED ADVERTISING RATES:

Line by line: 25p per word, minimum 20 words.

Semi-display £6 per single column centimetre minimum length 2 cm (Please supply A/W as PMT Or supply rough setting instructions)

Conditions. All copy for Classified section must be pre-paid. Copy date 7 days before publication

If you wish to discuss your ad PLEASE RING Diane Davis 01-437 4343

Here's my classified ad.

(Please write your copy in capital letters on the lines below.)

		Please continue on a separate sheet of paper	

I make this .... words, at .... per word so I owe you £ ....

Name ....

Address ....

....

....

Telephone ....

Please cut out and send this form to Classified Department *Popular Computing Weekly*
12 13 Little Newport Street London WC2R 3LD


ARROW MICRO SERVICES
- Commodore 64 -
ARROW TURBO-SAVER
Fed up with waiting for those programs to load? Well you need Turbo-Saver. Easy to use and faster than the 1541 disk drive, programs reload independent of Turbo-Saver. £7.00
ARROW DISKOPY
The selective disk copier will copy both PRG and SEQ files faster than 1541 back-up and you don't need to copy all the disk. Very user friendly and easy to use. £7.00
ARROW TRANSFER
Transfer your favourite games to disk, both multi part and Auto Runs. Works with most software. £7.00
ARROW DISK-DOCTOR
Now you can recover scratched files. Alter any byte in any block in Hex or Alpha, alter programs, alter the directory format, alike. £9.00
ARROW MICRO SERVICES
20 Portmeadow Walk
London SE2
Friendly Face
X-CERT
THE MUCH TALKED ABOUT X-CERT SOFTWARE
The saucest game ever released for the 48K Spectrum, is available now but only by mail order. Written entirely in machine code the game consists of 4 waves of SHOCK HORROR and SCANDAL, featuring the ugliest to the most beautiful of girls in which you have to ... CENSORED ... also you must ... CENSORED ... all the time. For your copy "Glass Kiss" (code name Smut) discreetly packaged send £5.00 to Titan Programs Ltd, 40 Market Place, Chippenham, Wilts. SN15 3HU
OVER 18's ONLY
BUY NOW BEFORE IT'S BANNED!
THEE JETSET WILLY EDITOR
100% machine code program. Will totally redesign Jetset Willy and create an extra 3 rooms.
£3.00 (inc. p&p)
Send cheque/POs to:
SOFTRICKS
1. Rowen Place,
Dundee,
Scotland DD30 PH
GAMES SOFTWARE
Q.L. SPECIAL
Most fantastic "Hangman" program for your QL with over 450 words, 14 categories. This program uses the features of this great machine.
ONLY £8.95 inc. P&P on microdrive cartridge
Also Mastercode — an addictive but exciting program for the QL using skill and logic, with various levels of play and incorporating fantastic graphics. The computer will choose from over 37,000 code permutations for you to break. This game is really addictive and fun for all the family.
ONLY £9.95 inc. P&P on microdrive cartridge
SPECIAL OFFER — Both programs on one microdrive cartridge for ONLY £14.
from: P.R. SPROSTON
QUANTUM SOFT
MARLOES, BORROWBY
THIRSK, N. YORKS YO7 4QP
SUNARO SOFTWARE
Quickshot joystick £9.75
SUNARO SOFTWARE (PCWC3), PO box 78, Macclesfield, Cheshire SK10 3PF
PROJECT X
THE MICRO MAN
TEXT ADVENTURE 48K ZX SPECTRUM
COMPASS SOFTWARE (PCW 1)
83 Coroms Road, Norwich NR1 1JP
HOLMES
Spectrum 48K £11.40
Full Throttle £5.70
Quo Vadis (C 64) £8.50
Midway (C 64) £8.35
Zaxxon (C 64) £8.50
Zim salabim (C 64) £8.50
Quickshot II £9.50
Cheques/POs to:
La Mer Software, 22 West St, Weston-super-Mare, Avon BS23 1JU. Tel: 0934 26339
SOFTWARE BARGAINS
MASTERTRONIC GAMES
3 FOR £5.00
THE TRIAL OF ARNOLD BLACKWOOD
A NEW CONCEPT IN ADVENTURES FOR THE
AMSTRAD 64
(ALSO AVAILABLE FOR DRAGON 32) £5.00 INC
NEMESIS, 10 CARLOW RD, RINGSTEAD, KETTERING, NORTHANTS NN14 4DW
DUPLICATION
HIGH-SPEED CASSETTE DUPLICATION
* Full-colour laminated inlay card
* Cassette labels
* Artwork
* Blank cassettes
A comprehensive range of professional services at probably the lowest prices in the U.K.
High-speed loading of programs at up to 10 times the normal speed available for some customers at no extra charge.
Write or telephone for full details.
LOGICOPY
GOLDSTAR HOUSE
198/200 QUEEN'S WOOD DRIVE
LEEDS LS6 3ND
DATA DUPLICATION
M G COPIES
Burntwood, Walsall, West Midlands.
05436-78978 (24Hrs)
Data duplication, quality cassettes, printing, distribution to customers with competitive prices and fast turn around. Price lists and samples on request.
0869 252831
"DATATAPES" for highest quality blanks and data duplication, call now for a sample quote. You will find us VERY competitive. The Midland Railway Grain Warehouse No 2, Derby St, Burton Upon Trent, Staffs (0283) 38184
THIS SPACE FOR SALE
£18
TELEPHONE:
PCW CLASSIFIED
01-437 4343 Ext 206
SOFTWARE
HORSE RACING ANALYSIS BY COMPUTER RATING METHODS
Why persist in backing losers when you could with the aid of your computer be backing winners instead. Answer in turn about 22 questions that will appear on your screen concerning each horse engaged in the selected race and BINGO the computer will present you with a very accurate RATING on the ability of each and every horse in turn. The answers to all questions can be found in the sporting papers. This unique method of RATING comes to you for both Flat & N/H on cassette for Spectrum 48K & Dragon 32 users. Don't delay, write today enclosing a S.A.E. for further details to C.R.M. 14 Langdale Place, Newton Aycliffe, Co. Durham DL5 7DX.
ARE YOU STILL STICKING PINS IN COUPONS? — Our Spectrum 48K Pools Forecasting system is guaranteed better than chance — the forecasts draws for all English and Scottish teams. Updated for coming season. Detailed owners manual — launch price for limited period £5.95 (inc P&P). Cheque/P.O to Mistral Software, Dept PCW3, 241 Forest Road, Tunbridge Wells, Kent.
Access
Book your Classified or Semi-display advert by Credit Card
Call Diane Davis on 01-437 4343
BARCLAYCARD VISA

COMPUTER SOFTWARE, BUSINESS AND GAMES FOR MOST COMPUTERS.
Commodore 64 VIC 20 BBC Atari Dragon Spectrum MZ700, ZX81
most Pendase for CBM 64 Spectrum BBC Atari Dragon Spectrum MZ700 ZX81
next releases for CBM 64 Spectrum BBC Every 2 weeks — just send S.A.E. and we send you a new list every 2 weeks
Also C15 data cassettes 40p each. 5 C15 data cassettes £2.40 5¼ floppy discs D-sided — Dt. density £2.30 each or 5 for £10 We also supply all computers
Send to M.J. Seaward St. Olaf's Road, Stratton Nr Bude, Cornwall EX23 9AF
Tel (0288) 4179

MICROWORD
THE 'FAMILY' WORD-PROCESSOR
For labels minutes of meetings labels manuscripts, typing school etc. Ideal in the home classroom small business. Easy to use and — easy on the pocket!
Send £9.90 for tape plus 50p post+packing (Cheque or Postal Order) to
SOFTWARE LIAISON, 8 Darwin Road Welling, Kent DA16 2EG. Tel 01-304 3411
FREE INTRODUCTORY OFFER
(To the first 200 customers 4 Super Games for ELECTRON/BBC)

SPECTRUM 48K versatile analyser 3000 word manual fast fourier transform DFT window functions Hilbert transform convolution deconvolution correlation demodulation integration differentiation modulus, phase real, imaginary display plot £8.00 cheques see details Softbug 35 Ellenbrook Lane Hatfield Herts AL10 9RW

JOYSTICK ART
A multi-coloured drawing program for Commodore 64
Turn your Joystick into a high-res graphics pen
Create pictures & games background to exhibit your imagination. Save and use them in your own Basic programs.
Circles, squares, triangles, lines, letters, to erase freehand and more
On Cassette £8.95
Cheques/PO to
[illegible] 1 Lyndon Close Woodley Reading, Berks RG5 3BF

SPORTING FORECASTS PROGRAMS by Professor Frank George for Commodore 64 BBC Electron Spectrum, Dragon Football Forecast Poolperm and Horse Forecast now available Details from Pinngware PO Box 161 Brundall Norwich

SERVICES

BBC MODEL B/ELECTRON OWNERS
See your programs in print. Listings made from your cassettes. Also word-wise facility
6p per sheet (Av. 54 lines per sheet) Minimum order £1 Price inc p&p.
Tape and payment to
M.R. Morris, 18, Finch Close, Thornbury Bristol BS12 1TG

SPECTRUM REPAIRS
We expertly repair Spectrums for £15 inclusive of parts labour and return postage. Spectrums upgraded to 48K for £24 including post.
R.A. ELECTRONICS 58 Kimberley Road Lowestoft Suffolk.
Tel. (0502) 66289

COMMODORE REPAIRS By Commodore approved engineers Vic 20 Modulators £6.50 Vic 20 from £14.50 CBM64 from £18.00 C2N from £7.00 printers, disc, etc for more details write or tel G.C Bunce & Son, 36 Burlington Road Burnham Bucks. SL1 7BQ Tel (06286) 61696

WHY DO SPECTRUM USERS FROM LANCS, DEVON, ESSEX, & CAMBRIDGE SEND THEIR MICROS TO US FOR REPAIR?
Average price £ [illegible]
● Only Co in all U.K. offering while-you-wait service
● Our 24 hour turnaround every micro insured for return journey
● Phone or send for free estimate enc. £1.50 (UK), 10.50 (Eire, C.I.)
● No hidden handling charges.
● Special rates for schools.
● Please phone for appt.
MANCOMP LTD. (dept. PCW) [illegible] Manchester M12 [illegible]
Tel 061-224 1888.

HEMEL COMPUTER CENTRE LTD
For fast reliable repair service send your 16/48K Spectrum computer to us
We will repair and return for £18 + £1.50 p&p
Also BBC Commodore Atari and Dragon service
Hemel Computer Centre Ltd. 52, High St. Hemel Hempstead, Herts HP1 3AF
Tel. 0442 212436

BBC SPECTRUM REPAIRS
★ Spectrum repairs £18.50 inc. parts insurance and p.p.
★ BBC B repairs £18.50 + parts, insurance and p+p.
Send your computer with cheque or P.O. for £18.50 and description of fault to
SUREDATA (PCW) Computer Service 45 Wychwood Avenue Edgware Middx.
Tel 01-951 0124

SINCLAIR COMPUTERS
EXPERTLY REPAIRED
and thoroughly overhauled by professional computer engineers using only top grade components.
All modifications recommended by Sinclair are fitted and all units meet [illegible] and fully guaranteed for six months.
MP ELECTRONICS
The Laurels Wendling Dereham Norfolk NR19 2LZ
Spectrums £20 ZX81's £12.50 Spectrums [illegible] Upgraded to 48K £28.50

listings **QLPRINT** documents for **AH/JM QL** owners
Basic listings £1.50 } Any length
Quill documents £2.50 } Inc P&P
Send tape address cheque PO to
QLPRINT
Chubbs Cottage Budville Lane Hatherleigh Devon
EX20 3HX

REPAIRS — ZX81 — SPECTRUM out of guarantee repairs by our computer dept Engineers have had three years experience servicing Sinclair computer products Price including p+p ZX81 — £11.50 16k Ram — £9.95 Spectrum — £18.75 Send with cheque of P.O. to TV service of Cambridge Ltd French's Road, Cambridge CB4 3NP Tel (0223) 311371

QL SOFTWARE

PRINTERS
THE AMAZING KAGA,
Taxan N.L.Q. Printers are here!
160 C.P.S. near-letter quality. All usual fonts, tractor and friction feed. Ideal for Q.L., BBC Spectrum and Interface

80 Column	£269
156 Column	£269

Paper labels and accessories all at silly prices.
Phone for quote and details
EIDERSOFT 01-478 1291
(10 am-7pm)

BOOKS

COMPUTER BOOK SPECIALISTS! Electron Spectrum oric S.A.E. for lists. D.A. Armstrong 30 Octavia Street, Kircaldy KY2 5HH Fife Scotland

CLUBS

THE INTERRATIONAL ADVENTUNE CLUB
For full Membership details and an application form write to
I.A.C Membership Dept 10 Ennis Close Harpenden HERTS AL5 1SS
Or Prestel Mailbox number 582786863

EDUCATIONAL SOFTWARE

[illegible]
Programs that are enjoyable and Educational [illegible] for spectrum [illegible]
[illegible]

COURSES

COMPUTER COURSES
TAKE A MICRO-BREAK AND COME TO BOURNEMOUTH
Mid week and weekend courses from beginners to advanced Basic M/C code and assembler courses available on request maximum 10 persons per course. Commodore 64's and BBC 'B's used or bring your own micro and we will adapt our courses to your machine
For further info write to
THE MICRO-LEARNING CENTRE Saint John's Lodge Head 18, Saint Swithin's Rd. South, Bournemouth

ILEA PADDINGTON COLLEGE
Evening sessions
Z80 Machine code programming (Mondays)
Introduction to the Z80 Microprocessor (Tuesdays)
Digital Electronics (Wednesdays)
For 12 weeks 6.30 to 8.30 pm Starting next week,
Department of Engineering Technology Paddington College, Paddington Green London W2 1NB
(01) 402 6221

COMPUTER WORKSHOP
PRACTICAL COMPUTING SERIES OF 1 DAY COURSES
Beginners Business applications programming £25 per day (lunch inc)
Tel 01 778 9000

MAGAZINES

DRAGON USER
To make the most of your Dragon you need **Dragon User** — the independent magazine for Dragon owners. To make sure that you receive a copy of Dragon User regularly subscribe direct to us. A year's subscription costs £10 for 12 issues (overseas rates available on application). Send a cheque or postal order payable to Dragon User and accompanied by your name and address to Dragon User Subscription Department Oakfield House, Perrymount Road Haywards Heath Sussex RH16 3DH.

HARDWARE

TOSHIBA HI-RES 14" COLOUR MONITORS
2nd user but excellent condition TL input RGB sync No case £119.50 inc. carriage paid
Tel Lucas
(0482) 702990/701437

MONITORS
Philips V7001 with R.G.B. composite and sound!
Amazing £59!
Kaga KG12 (N.B. suits 85 column Q.L.)
Amazing £99!
All prices Ex V.A.T., Delivery £5
Tel Eidersoft 01-478 1291
(10am-7pm)

OEALERS

SPECTRUMS SERVICE AND REPAIRS
MAIL ORDER OR CALL IN
HUGE
selection of software and full range of accessories SAE for lists
Enfield Communications, 135, High Street, Ponders End Enfield, Middx.
TEL 01 805 7434

FOR HIRE

TO HIRE a computer from Spectrum 48K upwards please phone or write to Business & Computer Services 294a Caledonian Road London N1 1BA. Tel 01-607 0157

RECRUITMENT

PRIVATE FUNDS AVAILABLE
FOR SOFTWARE DEVELOPMENT
Competent programmers are invited to apply for further information
BOX NO (PCW1) (CLASSIFIED) Popular Computing Weekly 12-13 Little Newport Street, London WC2R 3LD

FOR SALE

LET "Saucy Sally Reveal her four greatest assets to mature over 18 year olds. Sex" Drive "Fun pt 1 and "Fun pt 2" Only £2.99 each! £4 99 any two £6.99 for three and only £8 99 for all four! Available for all popular computers now! Prices must rise before October 31st. Send cheque PO (In Sterling) to Triple-SSS Windermere Cherrywood Road Loughlinstown County Dublin Ireland

SPECTRUM REPAIRS £14 including parts, P&P etc ZX81 £11 Fast reliable service (average repair 24 hours) by qualified engineers — Tel 0772 634887

48K Spectrum plus book on programming spectrum plus £40 software including chess, raiders etc Pc. Bargain at £75 Phone Ascot 21701

DRAGSELL DRAGON 32 CGP 115 printer disk-drive monitor with leads for everything joysticks and £300 00 worth of software dust covers for everything will sell for £650 00 o n o or will sell item separately ring Raj on 01 743 8856

THE DUNGEON. The third in a series of text only journeys of myth and magic for the 48K S.A.E. for list of other games D Newton 4 Fewfist Green Westhoughton Bolton BL52EP

AMSTRAD CPC464 "How to win the pools" Simple but brilliant Only £3 75 inc P&P Cheques P O s to S Creighton 7 Ibrox Street Glasgow G51

INFINITE lives for Manic Miner CBM 64 send £1 50 incl P&P to M R Deane 12 Redcrest Gardens Camberley Surrey

CBM 64 software for sale. All originals including turbo copier to convert slow loaders to turbo write to M. Barker 90 Long-meadow Rd Knowsley Merseyside L34 0HS May consider swaps

RESEARCH MACHINES 380 Z, 56K Ram Hires Graphics DS/SD Disks, CP/M 2.2 Pascal Basic Fortran Macro Languages TXED word processor £1380 ono Oxford 512431

DRAGON 32 for sale with joysticks and 24 popular original games worth £250 whole lot worth £450 sell for £150 Telephone 0388-663170

48K SPECTRUM, interface 1 micro-drive 2 cartridges all leads manuals some software realistically priced at £175 Tel Barry on 01 839 4012 (SE London)

SPECTRUM 48K inside fuller(fox) keyboard, printer +7 rolls soundbox (amplifier 3 channel sound zanalogue joysticks Atari joystick) software forth, All manuals +ROM disassembly cassette recorder perfect condition £150 Croydon 01-688 6210

TRS 80 tapes backgammon checkers, sea-site pinball, pyramid 2000 +6 others Program books games/business offers to (Cambo) tel 063875-410

COMPLETE PCW vol 1/1 to vol 3/27 Reasonable offer secures Share postage Strickland 30 Mutual Street Doncaster DN4 0EF Tel 62578

MICROLINE 80 DOT Matrix printer £150 Spectrum Kempston E interface plus wordprocessor software £40 Phone 01-556 1841 weekends after 6pm weekdays

BBC model B computer joysticks cassette recorder several games intro cassette, user guide all leads, as new £300 ono Tel. 01 543 0678

WANTED

FAIR DEAL? Why accept a relatively small sum for a program that might earn you many thousands of pounds. We pay high royalties! You retain copyright! We give free appraisal and marketing assistance Don't hesitate! Send tape and instructions to 4th DIMENSION Unit 4 4th Avenue Bluebridge Halstead Essex

WANTED Top cash paid for home computers and accessories in good condition. Ring or mail (phone for quote) Computamart, 195 Seabourne Road Southbourne Bournemouth Tel (0202) 433759

Computer Swap 01-437 4343

Free readers entries to buy or sell a computer
Ring 01-437 4343 and give us the details

Acorns for sale

400K DOUBLE SIDED disk drive for BBC with disks and software £200 ono Micronet Acoustic Modem with software £30 ono Phone 01 850 6435

BBC B, Disk interface single disk drive Rom Board Wordwise plus programs books cables etc. 2 months old. Perfect £700 ono Cumaw Lyng, Norfolk. Phone Norwich 872209 any time

BBC B SOFTWARE definitely originals Lost In Space Frankling Tomb 737 Flight Simulator Vectors Graphs Vaale £55 Sell for £20 ring Terry 01 223 0937 (evenings) 01-633 5678 (day)

BBC SOFTWARE for sale Arcade Action £5 Philae Quest £5 Pimania £5 Snowball £5 Jet Power Pack £5 Hardly used Tel 0788 812940 (after 7pm) for details

BBC MODEL A 32K Includes leads manuals many arcade games magazines and books Worth over £400 will accept £220 Tel 0273 410800

ACORN ELECTRON with manuals and intro cassette plus cassette recorder with leads £150 Tel 01 328 1417

BBC MODEL B 1 2 O/S with BBC data recorder Never any loading problems As new Includes manual 16 Mem programs (inc. Acorn Chess) £360 ono Tel (0480) 213020 after 6pm

BBC 'B Basic II OS 1.2 Disk Interface. Speech synthesiser Ram Board Wordwise View DiscDoctor Exmon Beebcall Graphics joysticks, software, books mags £590 ono will deliver Cardiff area. Tel Blackwood (0495) 225331

BBC B SOFTWARE. Mint condition Titles Include Pimania, Vortex Snapper Fortress Zalaga Chuckie Egg Rocket Raid Bed Bugs & ten others For sale Tel (0856) 3428 ask for Andrew (after 5pm)

ACORN ELECTRON — must sell for cash quickly With hundreds of magazines Quality Phillips CCR700 computer compatible recorder and loads of software and cartridge interface and books Quick cash sale wanted Phone 051 733-0090 After 4 Richard

FOR SALE Eprom programmer for BBC Supplied with over over 30 Roms (Wordwise Beebcalc etc) Worth over £1500 sell for £150 Phone (05827) 66152

BBC DISK DRIVE Teac S/S 40 track full height with built in PSU Includes cables and disks £120 ono Tel 01 942 5641 x 227 daytime only

BBC PRISM acoustic modem for sale + Rom software £45 ono Phone Giuseppe on 01-672 4212 (after 5pm)

BBC B OS 1 2 as new with data recorder joysticks books and £900 of software Worth over £1300 accept £330 Call (0484) 41886 between 3pm and 8pm weekdays.

BBC AND ELECTRON software going cheap! Over £350 value at 30% to 50% original price All originals Also several books Would consider total offer Phone Clacton (0255) 814523 anytime

EXCHANGE BBC Model B with disc drive software books etc value over £1150 for Commodore 64 plus disc printer monitor and accessories same value Best offer accepted Ilfracombe 66032 evenings and weekends.

BBC B 1.2 O/S perfect condition 2 years old £250 Phone Abingdon (0235) 30760 Address 34 North Avenue Abingdon Oxon OX14 1QW

ACORN/SEIKOSHA AP 100A Printer with some paper and manual 80 columns with graphics capacity £215 new will sell for £140 ono Tel Camberley 78423

BBC MODEL B 1.2 OS Barely used Reason for sale £500 Tel Chester 0244 378549

BBC B INTERFACE case joysticks, cassette recorder some s/w Hardly used £400 Also Slimline 100K disk drive + disks Worth £235 Sell £180 Tel 948 0787

BBC MODEL B Wanted TFB 4 months old £700 s/w + Roms + speed kit, 400K drive Many extras manual £1450 accept £800 ono Tel 0222/ 552228

TEAC FD55A 100K, disk drive for BBC Inc Cables Format disc games disk — £75 01 943 3764

ACORN ELECTRON, 5 books data cassette First Byte joystick, interface + several games £300 ono 070 1884

BBC 1 2 O/S Quickshot joystick with switchable interface 3 months old Guaranteed 15 games In Fortress + micro Olympics Lead boxed Sell £400 Tel 203 3925 (Heston)

BBC B 1.2 DFS Alpel ROM Board £395 ono Acorn teletex adaptor as new £175 ono Acorn Disc interface kit £75 Microware double density disk unopened £90 ono orig not wordwise Q manual £30 0227 750600

BBC BMicro 32K, 5 books Inc: Advanced user guide joystick lots of S/W (original) £300 ono Tel Runcorn 67313.

BBC 400k S/W Disk Drive Disk doctor Word wise Xmas Toolkit Basic I & II Rom fitted & S/W RAM Books mags S/W £1 100 ono Full details Tel John 0442 54288

ACORN Joystick £10 BBC games (all originals) chess chieftain dodgem shuels £4 00 each O Skinner White Clyde Rogers lane Stoke Poges Bucks SL2 4l

ACORN ELECTRON + £40 of s/w under guarantee 5 months old Leads manuals 1 book mags £170 or swap for CBM 64 + C2N cassette Tel 01-670 3583 6-9pm

BBC MODEL B + magazines + voltmace joystick Asking £235 01 736 7714

BBC MICRO 32 model B The authorised tape deck Dust cover Two books £100 bought s/w Good condition 12 months old Sell £300 Tel 863526 Bristol

BBC MODEL B WITH disk inter 1 green monitor Word Wise data recorder Joystick £200+ of s/w and manuals All as new £400 the lot. Tel 0462 732802

BBC MODEL B + disc drive (200k SS-DD) + disc s w + 32k sok disk Sine Way Ram board + Word Wise Acorn 0 98 DFS The lot £700 ono Tel 01571 2870

Ataris for sale

ATARI 1050 Disc drive boxed new £250 810 programme recorder £20 also atari software to sell or exchange 0322 408050

ATARI VCS 2600 joystick + paddles new power pack cartridges Demon attack Frogger fire fighter Asteroids Worth £250 Sell £130 Tel 0455 614243

ATARI VCS in very good condition with 8 cartridges which include berserk, tennis ski-ing plus joystick paddles, bargain £80 or swap for 16k Spectrum or VIC 20 Tel Skipton 69307

ATARI 800 48K Basic Cartridge 410 recorder Rom Q cassette S/W Proper keyboard le stick S/W worth £100 Sell £180 ono Tel Rain Hill (0440) 75266

ATARI Software for sale miner 2049 ER £15 preppie £10 steeplejack £5 all V G C tel Chesterfield (0246) 851342 after 4 30

ATARI 400 16k with 810 disk drive + cassette recorder + manual. Also with 2 Superchamp joysticks 3 parts of Invitation to Program French BASIC tape + 5 top games (original) cost £750 Sell £325 Tel Weybridge (0937) 55203

ATARI 800 (48k) + 1050 disk drive + recorder + s/w and all Basic manual + handbooks Immaculate condition £485 Quick sale needed Phone Brentwood (0277) 225845 evenings, weekends

ATARI 800 WITH 48 program recorder 5 games. £180 ono Tel 0702 347288

ATARI 1010 cassette recorder manuals etc — Atari Defender cartridge any offers. Tel Cardiff 565 784

ATARI 800 16K + cassette + cartridge joystick Sell £50 Tel Notts 208108

ZX81s for sale

ZX81 Manuals leads £30 of S/W cassette recorder all working order £50 Tel Huntingdon 217680

ZX81 S/W for sale £1 each includes spacefreal Fantasy games The Guantlet ZX81 Menoploy Write to me for list. W L Tang 6 North Farm Road Lancing West Sussex BN15 9BS

ZX81 16K Software for sale Pimania Night Gunner kong 3D Defender Invaders force and many more wanted Trader/Mazoga + Atic Adventure will swap 2 games each **Tel.** Nottingham 282785

ZX81 16K Ram 8 games all leads manuals, + mags. £30 Tel Dronfield 416088

ORIGINAL ZX81 Software for sale mint condition JK Greye 3D Defender I.C L. Super programs (Volume[Sinclair games of skil (1K) new £15 sell £5.00 the lot phone David Oxford (0865) 735836

Spectrums for sale

48K SPECTRUM Tape recorder over £300 of software (lunar Jetman Noon Alert ant attack) magazines all in good condition £190 ono Tel (0604) 711223 ask for Bryan

48K SPECTRUM Alphacom printer and paper Interface 2 Kempston interface and joystick, tape recorder S/W and books all in V G C £220 o n o Tel (061) 736 7168

SPECTRUM ORIGINAL Software sale Quill Scrabble Stonkers Alchemist, games designer turk — ender plus 14 more worth £150 will sale £50 ono for all Phone (04024) 51239 Ask for Ian

SPECTRUM 48K Good condition easy load amplifier RS232 Modem 1 Printer interface over 70 well known programs Plus manual leads E T C also non — working sound board £110 ono Tel Oxford (0865) 777510 after 6 15 p.m

SECTRUM USERS! For sale DK tronics keyboard £30 cheap software Atic Atac, jetpal Lunar Jetman jetset Willy Manic Miner Chukie egg scrabble Fred etc Tel Frank Haywood Wolverhampton (0902) 51126 anytime

ZX SPECTRUM Software including cookie VU3D forth psst. valhalla, snope and android one stale five books (one for the ZX81) including mirco games end over the spectrum Telephone 0806 — 41221

FOR SALE ZX Printer plus 8 rolls of paper Want £30 or will swap for currah microspeech write to Mr D Scott, 28D Harden Place Harwick Roxburghshire Scotland. TD 7BY

48K Spectrum and software plus fuller keyboard also mixed books and magazines £140 00 o n o worth £280 Tel 061 356 1623 and 8pm

48KSPECTRUM 9 months guarantee tape recorder currah speech 40 magazines £20 books quill, black crystal jet pac, startrek. All boxed as new worth £270 will accept £100 01 587 — 4701 Mark.

SPECTRUM BITS Power box, ariel has spare issue and catalogue tape £12 the lot o sell separately or swap for a programmable interface Tel 01 486 — 9525

48K SPECTRUM + Carving cane printer £25 worth of S/W sell for £100 Tel 587 — 4860

ZX48K SPECTRUM File Master Unit Printer Interface 2 and Cartridge Kempston Interface + joystick tape reader keyboard overlaps loads of mags and S/W Barging £280 00 phone (021) 552 1150

48K SPECTRUM with S/W memory + books £100 o n o 01-330 2012 after 6 pm

SPECTRUM 48 K plus printer manuals brand new unused (unwanted gift) £100 Tel 01 — 500 — 4206 (Eves)

SPECTRUM 48K FDS keyboard kemston + fox I/F joystick printer cassette amp over £800 software and boxed the lot for £300 phone 673 3491 after 7 p m

48K Sinclair Spectrum Kempston Interface joystick. Fuller Box 50 telex cell originals W H smith Tape recorder £99 Tel 0698 84471 Graham

48K SPECTRUM Interface I — microdrive ZX printer 8 rolls of printer paper light pen tapes. (original) will split £290 Tele 01 — 987 4906 after 6 pm.

48K SPECTRUM with W H Smith tape cassette £40 £30 of mags inc crush £80 of original S/W offers Tel Bigger Hill 72588

48K SPECTRUM still under gaurantee with cassett recorder currah speech kampston interface sound amplifier over £200 of games + many books + mags £ 220 one Tel Gravesend 88100

SPECTRUM 48K + £50 of S/W—£110 Tel 01— 461 — 2289

SPECTRUM 48 + Interface + microdrive all still under guarantee + tape recorder 38 top quality games Incl. Hobbit perbaten scrabble plus Sinclair magazines worth over £800 Sell £300 Tel Hickly (0455) 635418

48K Spectrum + £60 of S/W books £120 ono Tel 061 794 1686

48K SPECTRUM programmeable interface + joystick + S/W £140 Tel Portmouth 267800

48KSPECTRUM (New Keyboard) boxed and complete sound amplifier £45 of sale software Spectrum mags and book everything in mint condition Free software catalogues only £110 01 — 892 1920 (after 5pm)

48K SPECTRUM Software for sale all top name at half price or swap some for currah speech unit also quickshot joystick £5 00 Tel 856 — 6279 East London ask for Chris

48K SPECTRUM As new with all manuals and tapes. Plus £25 of games tapes plus data 5000 console case £80 or will sell separately Goring (0491) 872588

ORIGINAL SPECTRUM s/w for sale Birds + Bees, Stalk Atack Lazer Zone Cyber Zone Codename Matt Fighter Pilot, Sabre Wolf Each ½ of original price Tel (0223) 68148

48K SPECTRUM + Kempston inter face + joystick. £400 of s/w mags and books. £300 ono Tel Ipswich 43080 after 6pm

48K SPECTRUM B/W T V joystick Interface £250 of original s/w Mags £470 Worth Sell £240 Tel Jim 806 6387 Wed/Thurs 12.30-4pm

16K SPECTRUM £65 00 Tel 367 8201 Mr Small

CX SPECTRUM 48K + Atic Atac Sabre Wolf Zip Zap Alchemist + other original s.w Total £150 Sell for £60 Tel Worthing (0403) 211439

48K SPECTRUM 11½ month guarantee + speech unit + £100 of software + programmable joystick Interface + £20 of mags Worth £300 Sell for £130 Redhill 65554

SPECTRUM 16K + 32K Ram Pack + £130 s.w + books inc Manic Miner Atic Atac; Must sell £105 Tel 0772 686299

48K SPECTRUM ISSUE 2 DK Tronics keyboard Currah Micro Speech ZX printer Stackle rifle carrying case 15 orig nal cassettes. Cost £488 sell £280 Tel 363 3579

48K SPECTRUM 3 MONTHS old Fuller box inc joystick interface r Demo tape cassette Quickshot joystick + Curser joystick Dust cover £48 of s/w originals £7 of mags Fully boxed instructions es/con £225 ono 01-803 1563 Mr Ross.

COMPLETE SYSTEM 48k Specrum 20in TV cassette recorder + joystick + interface dust cover 3 books s/w Many util ties literature £220 one Tel Newport Salop 0852 15710

SPECTRUM S/W TO SELL. TLL. Tank Dust. Full Throttle Lords Of Midnight Hulk Groucho Krakatoa etc. Originals only for sale Tel 01-574 9844 ex 540 or 879 0531

48K SPECTRUM + ZX interface microdrive cartridges All under guarantee Lots of s/w books and magazines mint condition £200 ono Medway 221038

48K SPECTRUM PLUS extra 32k Ram + over £50 worth of s/w + over 8 months of mags 48 worth £250 Sell for £170 Tel 241 0376

48K SPECTRUM, Joystick interface, books, mag -clipugs £150 of software mint condition still under guarantee sell for £100 o n.o also vectrex fo sale with 4 cartridges mint condition sell for £95 o.n.o tel 864-7085

For sale Timegate for 48K spectrum write to 17 Rendor Iasse Sandbach Cheshire CWII 9TD wanted the Quill for 48K Spectrum will pay up to £8 Tel Sandbach 5410

48K SPECTRUM, Joystick and Interface Data recorder with assorted software and extras. will sell for £100 contract Neil Spence 9 ansire Road S/Queens Ferry West Lothian Scotland

48K SPECTRUM 5¼" viscount disk drive mag program (all originals stored on disk) cost £245 + Bargain £150 o n o Tel 051-339 5608 (after 5pm)

SPECTRUM ZX81 S/W Books Inc Machine language Worth £38 00 Sell £18 00 ono Tel Tonbridge (0732) 36920 Mr Wrich

48K SPECTRUM Good condition boxed Guaranteed £100 tel 01 568 7844

Commodores for sale

CBM 64, C2N cassette unit, Atari and quickshot joysticks, £150 00 of boxed & £270 worth of S/W Reset switch £615 00 V G C £275 o n o Tel Mathew on Brighton (0273) 415776

VIC 20 Cartridges for sale very cheap Tel 061 643 5858

VIC 20 C2N cassette with 16K switchable ram pack, joystick + S/W 3 books all boxed £100 the lot Tel 01-301 1241 eves.

VIC 20 Starter pack and some program books Ideal for young beginners Un Wanted present as new £100 o n.o. Tel 01-599-0420 Evenings

VIC 20 + Joystick + C2N cassette and + 9 cartridges + 11 cassettes worth over £300 Asking only £160 o n o Tel 061 663 0806 after 8 pm

CBM 64 CN2 deck, 1520 Printer plotter voice box, quickshot II joystick Intro to Basic Part I Programmable interface guide + S/W Sanny 12 B&W TV moniter + computer desk £380 o.n.o Tel 01 385/4216

VIC 20 + Tapes and cassette £60 o.n.o. Tel 01 603-5320

CBM 64 + C2N cassette + reference guide mags + 9 games quickshot II joystick £390 or swap BBC 6 O S 12 in good condition with tape recorder Write to D Page 13 Alben Road Plaistow London E13 8PH

COMPUTER SWAP

Computer Swap entries are limited to 30 words. Either fill in the accompanying form and send to Computer Swap *Popular Computing Weekly* 12-13 Little Newport Street London WC2R 3LD or telephone 01-437 4343

All software offered through computer swap must be in original condition and for private sale only

It cannot be swapped

Warning It is illegal to advertise pirated software

COMPUTER SWAP

Please write your copy in capital letters on the lines below

Name ....

Address ....

....

Telephone ....

CBM VIC 20 21K Ram £100 of S/W + £80 of cartridge (original) + C2N cassette + 2 mother board removal + feeds mags Only £150 Tel 01-653 6307afts 5 p m

VIC20 16K + Cassette recorder + joystick S/W + programs manuals sell for £140 contact Karen on Hounslow — 572 6725

1515 CBM DOT matrix printer 32 C P S. £150 Bristol 710385 eves.

CMB64 1CR2 Cassette deck £200 of S W £40 of 300ks £280 one lot (0375) 678613

ENTIRE collection of CBM/Pet software for sale games business utilities and educational over £400 worth original programs on cassettes "petpack" "pet-test" "supersoft" ETC Bargin £85 ono the lot (0244) 675717

VIC 20 Books understand the micro usborne electronics many programs guide to your micro easy to understand leads on sound and graphics swap for vic 20 software.phone Scott Canvey Island 692307

COMMODORE VIC Starter Pac 16k switchable Ram pac software Mags one cartridge £135 o.n.o Tel Immingham (0469) 72854

VIC 20 Computer and C2N Cassette drive plus joystick, introduction to basic part I and £73 worth of S/W still under guarantee excellent condition £180 Tel Durham 731154

VIC 2016K Rams, Green Mohave Printer (Vic 1515) Cassett, floppy disc (Vic 1540) + Vic Printer + Vic file program £400 the lot. Tel Rab Knockholt (0950) 34455 24 Anphone

11 COMMODORE 64 Games ½ price to Attack Revenge Matic minor Hobbit Siren City Tel Droitwich 775186 benjamin.

SELL CBM64 Version of voodoo Castle £5 00 Write to 30 Highlands Road Sutton Coldfield West Midlands 373 5QS L.Hirley

VIC 60 Cassette recorder 16 expansion 100 + programmes (including 5 cartridges) plus software S & W Television £180 Telepone Leeds.

VIC-20, 16k Ram C2N tape deck £200 of s.w Joystick books + mags Worth £400 Sell £200 00 Tel 061 231 4344 (Ian)

VIC-20 + cassette deck + 16k + Intro to BASIC I 2 adventure cartridges + many cassette games £185 ono Can deliver in Leeds area Leeds (0532) 771540 after 6pm

CBM 64 S/W for sale Many American ones — Blue Max, Zaxxon Flip + Flop — Astro Chase etc Ask for MACS 0272 28672.

VIC 20 + cassette unit + lots of s/w original + mags excellent condition Suit beginner Can post. 01-882 8575

VIC-20 CARTRIDGE £5 00 each. Ad-Man — Speech Synthesiser £20 00 Tel 310-4031

VIC 20 + 16k Ram + C2N tape deck £300 of original s/w joystick + manuals Vic books. All boxed. £200 Tel 061 231 4344 Ian

CBM 64 + C2N cassette, joystick + s/w + mags. Still boxed. £210 00 Tel Andrew 01 660 7949

CBM SIMONS BASIC £35 ono. Tel 0642 672058 after 5.30pm

C64 + C2N games £195 ono Tel 458 7572 after 6pm

Wanted

WANTED Dragon joysticks Will pay up to £10 Also wanted back copies Dragon user Up to Dec 83. Tel Fareham 235466 evenings only

WANTED Microprocessor MPF2 software books. Also info on conversion to Apple programs. RC Jones, V P.A S 431 MU RAF Bruggen BFPO 25

WANTED. Back issues of "Your Computer" and other magazines up to February 1984 Write stating price and issues available to Charles Bajada 54 Ursuline Sisters Street O Mangia. Malta

SWAP MY CBM 64 complete with 1541 disc drive and C2N cassette joystick. Lots of s/w books etc for a BBC model B computer Tel Bill on Bournemouth 424092

WANTED ADVENTURE command module for TI99/4A also extended Basic module Tel Uttoxeter (088-93) 2821 (eves)

SWAP DIAMOND mind for BBC phone Portsmouth 824785

SWAP A DRAGON 32 with s/w worth £150 and mags for Spectrum (no s/w needed) Phone Thanet 20544 ask for Anthony or write to 3 High Street Margate Kent CT9 1DL

SWAP MY FUJICA P2 Cine camera for any BBC peripheral or sell for £20 ono. Phone 736 7714 ask for Salvatore

SWAP MY 6 × 3 snooker table plus cues and pool balls for a modem for the Vic 20 Ring Paul on 0702 540452 Southend on Sea

WANTED SPECTRUM user with microdrive one or Tandy CGP 115 printer to become pen friend and swap original software tips hints etc Please write Mr T D Parsons 42 Park Leys Harlington Dunstable Beds LU5 6LZ.

WANTED RIVER RESCUE cartridge box plus instructions Also need Hellgate box and help And instructions for Shadowfax, Space Storm, Will pay asking price. Tel 0292 75493 ask for Derek

WANTED DRAGON minus leads will hire off you for up to 4 weeks or will buy Tel Fareham 235466 eves Paul

SWAP DRAGON DOS cartridge for Premier DOS cartridge or sell for £80 ono Phone Peter Antrim 65346 for details

SWAP MY 2 MONTH old snooker table with all accessories 6 × 3 For CBM 64 and C2N s/w if possible Will add cash for more s/w Tel 061 831 7187 after 10 00 am ask for Rashid

WANTED MODEL expansion interface. Wanted TRS 80 model s/w for sale TRS 80 s/w (all original) Write to J W Brooks 39 Tetbury Drive Warndon Worcester WR4 9LG

SWAP COMMODORE 1520 printer plotter manual 3 rolls paper 11 mths guarantee and £50 for Seikosha GP100A printer or similar for Vic 20 or sell £85 021 353 8473

AMSTRAD CPC 464 modulator power supply for sale or exchange for anything (within reason) for the Amstrad Wanted software for the above machine Tel Fernoise 731424

WANTED Pacer 16K rampack or similar for Jupiter Ace 32K also considered. Telephone 0704 25814 or write to 11 Marlewood Avenue Southport Merseyside PR9 7NS

CAN YOU HELP? Copy of Your Computer February 1984 issue wanted Phone 0743 600096 (Butler)

TO SWAP Sony Walkman £50 Telepay TV game £20 Electron Mastermind £5 and £15 cash for just Vic 20 Nothing else Ring Terry on 88548

WWWILLL SOMEBODY phone me if they want to sell any of these (Vic 20) Gorf Superlander Omega Race Audiogenic's Frenzy Computer War or Atarisoft's Defender I need them NOW! 0558 822509

WANTED URGENTLY for Dragon 32 G4BMK Morse or RTTY Transceive Cassette or cartridge Twelve games given Microdeal Salamander etc Write to William 58 Balfron Crescent Earnock, Hamilton, Scotland

WANTED CBM 64 plus C2N plus s/w + books etc To swap for Sharp MZ700 + data recorder + printer + s/w Also swap 8 inch Shugart disk drives for CBM disk 01 6830963 evenings only Austen Redmond

SWAP STONECHIP prog joystick interface and gravity joystick for Fuller Box Master unit or Currah Speech Tel 01 8484110 evenings

WANTED BBC model B 1 2 o/s preferably with disc drive Tel Farnworth (0204) 76036

BBC (B) REQUIRED £200 upon paid. Phone (05827) 39152.

EXTENDED BASIC module for TI994A wanted Must be good condition with manual Tel Leeds (0532) 401634 or write Sam 43 Upland Grove Leeds LS8 2SX with asking price

WANTED BBC cassette recorder Also software for BBC B plus disk drive Plummer 302 Langland Road Netherfield Milton Keynes MK6 4HY

SWAP 48K SPECTRUM, ZX printer tape recorder plus £190 software (all originals) For full size printer for CBM 64 Mr C Nudsen Crayke House Cottage Musten Filey North Yorkshire YO14 0EQ

WANTED COMMODORE 64, must be in good condition Tel 0894 832807 Ask for Brian

SWAP CASIO FX201P programmable calculator for Spectrum ocne games programs ie Omnicalc Tasword ZX Slowloader etc Telephone 0642 814251

TO SWAP Yahzee + Moons mood the bikers + Fimatae + Winged Warlords + Knot in 3D for AGF programmable joystick interface. Tel 594 2281

SWAP COMMODORE 64 C2N joysticks, 7 books and software including pole position etc worth well over £500 for BBC B 5¼" disc drive and software Tel 0750 53181 after 4pm.

SWAP Vic 20 + 16K Ram + software worth £70 + joystick + Vic Revealed book + magazines worth over £100 for CBM 64 Tel 458 2518 (anytime)

WANTED 16K RAMPACK and P S U for ZX81 Units in need of repair might suit Tel Belfast (0232) 872477

SWAP Commodore 64 & C2N cassette player joystick £100 of s/w & Sony 6" monitor in exchange or part exchange for BBC B Ring Trowbridge (02214) 85812 ask for Philip

I WILL SWAP my Emmy 16 cine camera (as new) for any computer Phone (0506) 630975

SWAP Fuller box and demo tape for Currah micro speech and manual or sell for £20 Phone 061 924 8856 after 5pm

SWAP Vic20 starter pack with joystick data cassette & two cartridges and introduction to Basic part 1 for 48K Spectrum Must be good condition or will sell for £90 Phone 0407 4509

For sale

TI99/4A, 2 manuals, extended Basic, rom level cassette leads POM module S/W Le Adventure parse tomb Stone City, Cassette S W wargame adventure £15 ono Tel (Southampton) 7675518

QR Speech unit booklet demo tape £22.00 o n o stonechip programmable joystick interface £18 o n o both under guarantee Tel 0643 60636 (Peter)

INTELLIVISION game with voice synthesiser + 2 games new cassette swap for CBM 64 + cash adjustment Tel 01 519 3874

NASCOM3 MICRO computer 48K also £549 sell for £250 o.n.o or swap Tel Leamington spa (0926) 20849 after 5 pm.

MCP40 Printer + paper + aims of spare pens Interface cable Sell £100 & P&P or swap for brother HR5 for any printer and £50 cash Tel 0283798951 (Norfolk) A Scott.

QL FOR SALE— Best offer Jecinee Tel (0904) 769184

Zaxxon Cartridge for CBs colecovision + Epson S/W for swap or sell. Tel (0633) 863975

DISCOUNT Software used tapes selling at unbelievable price all originals at least 50% of normal price send SAE for list to Chris Hall 51 Clevely Park Belfast BT8 4NB Northern Ireland

SENSORY A chess computer cost £165 open to offers Tel 0302 48475 or 0302617428

ZX MICRODRIVE For sale £40 perfect working order with 5 months Sinclair guarantee send cheque/ P O to Mr Derek Scott 26D Harden Place Harwick, Roxburghshire Scotland TD9 7BY

FULLER BOX £25 OCP Editor assembler £5.50 monitor £5 60 paintbox £8 50 send cheque / P O to Mr R J Ingram Irelands Goose Green Warnham Horsham West Sussex RH12 3RS also 50p P&P please

FOR SALE Fuller master unit for Spectrum as new £27 also 12 pieces of software £20 or £40 for both Tel (077382) 3703

THREE TAPES INC Hells temple One flight Acheron rage for Oric I £15 Altogether 01 241-3193.

96K Lynx, parallel printer interface and tape recorder Lynx computing book lynx user (two issues) Excellent condition worth £380 bargain at only £260 phone 01-603-6873.

TRS80 S/W level I & II (all Originals) Tel 021 742 1448

GRANDSTAND Astro wars, power adapter and blop lenses worth £55 unwanted gift so first offer over £27 or swap for (Spectrum currah speech) Tel Ray (0283) 781244

PASCAL 4T With turtle graphics for ZX Spectrum used only twice £15 Telephone (0493) 720774 (Mornings)

BROTHER DAISY Wheel printer 2 ribbons 4 Daisy wheels leads connecting 64 £500 all with dust cover Tel 458 2098

ONC I16K cassette recorder + B+W T V £80 of 300ks, £50 of original tapes worth over £300 Any offer over £100 considered Tel 01 496 - 5363

ORIC 48K £100 inc £80 of S/W Tel Houghton-le-spring 845851

DOWNSWAY JOYSTICK INTERFACE. Hardly used £15 00 Tel Mr I Purdy 805-2631

SHARP MZ 700 fitted cassette + joystick + peeking + poking MZ700 Dust cover games S/W £120 Tel Uxbridge (0895) 58676

SCISYS chess champion Mark 5 and Mark Module £170 ono Casio PB 700 Portable Computer 32K RAM 16K Ram £160 ono Tel 01 531 2682

LYNX 48K.+ Tape recorder Leads manual 300ks, + S/W £100 Tel (0886) 877039 eves/weekends

VETRA JOYSTICK, unwanted Gift. 2 fire buttons Grip style handle Cost £11.95. Sell for £5 00 Tel Milton Keynes 586-765

LYNX 96 As new 300ks 20 cassettes all original, joystick + Interface Cassette deck etc £500 Sell for £300 Tel 01 204-1060 after 7pm

SENSORY II Chess Computer for sale Cost £188 open to offers Tel 0302-484 75

CURRAH SPEECH. Spectrum S/W latest releases (Originals) for sale Cheap prices. Tel (0705) 473968

ZX Interface 2, Microdrive + 2 cartridges very good condition will sell for only £90 Tel (0625) 51753

ADVENTURE HELPLINE

Denis Through the Drinking Glass on Spectrum. I cannot get the first drink and I cannot get out of Number 10. I Hamilton, 24 Byron Road, Sheffield S7

Hobbit on Commodore 64. How do I get out of the goblin's dungeon? How do I open the magic door and the side door in the mountain? Philip Marsh, 27 Riverdale Road, Ferrylane, Stanley, Wakefield, W Yorks

Espionage Island on Spectrum. I cannot get beyond killing the guard and going in the boat. what do I do next? Also, how do you operate the torch? Derek Taylor, 60 Allen Road Rushden, Northants.

Hobbit on Spectrum. I am playing the adventure with 8-9 year olds. I have 'mastered' 10% only and they are losing interest. Can someone give me some clues? D A Kessell, Kesfield Mabe, Penryn, Cornwall.

Hobbit on Spectrum. I need some help with the return journey. N R Williams, Hamar, Llangybi, Pwllheli, Gwynedd, N Wales.

Inca Curse on ZX81. What object(s) do I need to go down the porthole in the sand dungeon and to pass through the secret panel in the east wall of the panelled room? S Davis, 60 Millais Road, Leyton, London E11

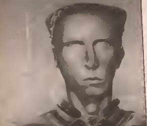
Eric Bean & the Lost Gnomes on Spectrum. I keep being stabbed to death by the goblin with the pikestaff. The Good Fairy is out very obliging and only resurrects me once. Michael Francis House 75, Castle Irwell Cromwell Road Salford M6 Lancs.

Urban Upstart on Spectrum. How do I get out of jail? If I eat cheese or drink lager I just return to the hospital. P Boyes, Lingmoor, Keighley Road, Cowling, Keighley W Yorks

Heroes of Karn on Commodore 64. How do I kill the pirate? Where is Anton's magic mirror? How do I get past the serpent? P E Arthur and J Arthur, 280 Baldwins Lane, Croxley Green, Rickmansworth, Herts

Diary

Show	Dates	Venue	Admission	Organisers
Personal Computer World Show	Sept 19-22 10.00am-7pm Sept 23 10.00am-5pm	Olympia 2, Hammersmith Rd, London W14	£3.00	Montbuild Ltd. 01-486 1951
Kit Fair	Oct 6 10.00am-5.00pm	Pudsey Civic Centre Pudsey W Yorks	70p adults 50p children	Northern Premier Exhibitions 0532 550468
Livingston Computer Fair	Oct 6-7 10.00am-5.00pm	Fair House Ladywell Livingston W Lothian	£1.00 adults 50p children	Inco/W Lothian Computer and 0506 30044
Computer Graphics 84 (over 16s only)	Oct 9 10 10.00am-5.00pm Oct 11 10.00am-4.00pm	Wembley Conference Centre	Free in advance £5.00 on door	Online Conferences 01-868 4466
Spectrum and Micro Show North	Oct 15-18 10.00am-5.00pm	New Century Hall New Century House Corporation Street Manchester	Free in advance from organisers	Micro Computing Graphics 01-941 6066
Computer Games and Systems Retailer Show (trade only)	Oct 17 18 9.00am-5.30pm	Novotel London W6	Trade	Bump Exhibitions 0895 444555
Home Computer Education and Games Fair	Oct 20 10.00am-5.00pm Oct 21 10.00am-5.00pm	Luton College of Higher Education	£1.50 adults £1.00 children	Evans and Kilgour 0582 70711
Electron and BBC Micro User Show	Oct 25-27 10.00am-6.00pm Oct 28 10.00am-4.00pm	Alexandra Palace London N22	£3.00 adults £2.00 children	Database Publications 061-456 8383
Home Tech 84	Oct 28-30 10.00am-5.00pm	Bruce Exhibition Centre	£1.50 adults £1.25 children	Nationwide Exhibitions 0872 470468



*Nightmare Planet was also published in our Sunshine Book Commodore 64 Adventures by Mike Grace

Special Tape Offer

Popular Computing Weekly exclusive
DISCOUNT TAPE OFFER

Nightmare Planet

for the Commodore 64

ONLY £1.50 *plus 25p post & packing*

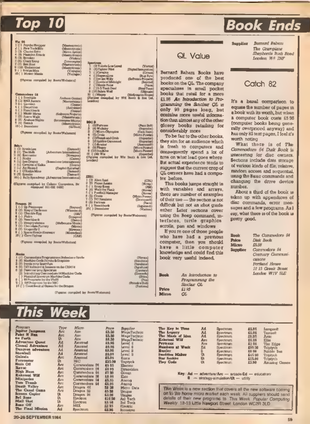
On a routine flight to Zen you are caught in a flash meteor storm and forced to make an emergency landing on *Nightmare Planet*.

You black-out during the crash and when you come round your valuable human cargo is missing . . .

Nightmare Planet is a text adventure for the Commodore 64 written for *PCW* by Mike Grace.*

All you have to do to get your *Nightmare Planet* cassette is to collect the three special coupons in this and the next two issues of Popular Computing Weekly and send them, together with a cheque or postal order for £1.75 made payable to Sunshine Books, to Nightmare Planet Offer', Popular Computing Weekly, 12-13 Little Newport Street London WC2H 3LD

1



Top 10

Vic 20
1 ( ) Psycho Shopper (Mastertronic)
2 ( ) New York Blitz (Mastertronic)
3 (3) Chariot Race (Micro Antics)
4 (8) Maestro Attack (Mastertronic)
5 (3) Snooker (Visions)
6 (4) Crazy Kong (Interceptor)
7 (7) Sub Hunt (Mastertronic)
8 (10) [illegible] (Mastertronic)
9 ( ) Bridge Man (Voyager)
10 ( ) Mower Mania (Voyager)

(Figures compiled by Boots/Websters)

Commodore 64
1 ( ) Scrabble (Leisure Genius)
2 (1) BMX Racers (Mastertronic)
3 (–) Cavelon (Ocean)
4 ( ) Decathlon (Activision)
5 ( ) Hunchback (Ocean)
6 ( ) Manic Miner (Software Projects)
7 (2) Space Walk (Mastertronic)
8 (8) Arabian Nights (Interceptor Micros)
9 (4) [illegible] (Mastertronic)
10 (–) [illegible] (MrTech)

(Figures compiled by Boots/Websters)

Atari
1 (2) Bruce Lee (Datasoft)
2 (1) The Hulk (Adventure International)
3 (4) Encounter (Novagen)
4 ( ) Blinky (Ocean)
5 (–) Sea Dragon (Adventure International)
6 (–) Caverns of Khafka (Cosmi)
7 (–) Air Strike II (English Software)
8 ( ) O'Riley's Mine (Datasoft)
9 (8) Zaxxon (Datasoft)
10 (–) Rally Speedway (Adventure International)

(Figures compiled by Calisto Computers, Birmingham 021-632 6458)

Dragon 32
1 (–) Up Periscope (Beyond)
2 (8) Ring of Darkness (Wintersoft)
3 (1) Chuckie Egg (A&F)
4 (–) [illegible] (Imagine)
5 (3) Hunchback (Ocean)
6 (7) Hungry [illegible] (Melbourne House)
7 (8) Chocolate Factory (Mirror)
8 (9) Dragonfly 2 (Hewson)
9 ( ) Space Shuttle [illegible] (Microdeal)
10 ( ) Cave Fighter (CAB)

(Figures compiled by Boots/Websters)

Spectrum
1 (2) Tornado Low Level (Vortex)
2 (3) Fighter Pilot (Digital Integration)
3 ( ) Cavelon (Ocean)
4 ( ) [illegible] (Bug-Byte)
5 ( ) Jet Set Willy (Software Projects)
6 ( ) Lords of Midnight (Beyond)
7 ( ) Match Point (Psion)
8 ( ) 3-D Tank Duel (Real Time)
9 (10) Sabre Wulf (Ultimate)
10 ( ) Mugsy (Melbourne House)

(Figures compiled by WH Smith & Son Ltd, London)

BBC B
1 (2) Fortress (Pace Soft)
2 (4) Wallaby (Superior)
3 ( ) Micro-Olympics (Data Base)
4 (5) [illegible] (Micro Power)
5 (7) Smash and Grab (Superior)
6 (6) Spitfire Command (Superior)
7 (1) Aviator (Acornsoft)
8 (9) [illegible] (Micro Power)
9 (10) [illegible] (Micro Power)
10 ( ) Mr Wiz (Superior)

(Figures compiled by WH Smith & Son Ltd, London)

ZX81
1 (1) Alien Raid (CRL)
2 (2) Planet [illegible] (Novus)
3 ( ) Krazy Kong (PSS)
4 (4) Walk the Plank (Novus)
5 ( ) Football Manager (Novus)
6 (5) Chess (Micro Power)
7 (7) 747 Simulator (Doctorsoft)
8 (2) Fortress (Pace)
9 ( ) Hunchback (Superior)
10 ( ) [illegible] (Visions)

(Figures compiled by Boots/Websters)

Books
1 (1) Commodore Programmers Reference Guide (Pitman)
2 (8) Machine Code Sprites & Graphics (Sunshine)
3 (8) Inside your Spectrum (Sunshine)
4 (6) DIY Robotics & Sensors on the CBM 64 (Sunshine)
5 (10) Discover your Spectrum (Century)
(2) Introducing Commodore 64 Machine Code (Granada)
( ) Mastering Spectrum Machine Code (Shiva)
8 ( ) 60 Programs for the Vic 20 (Pan)
9 ( ) 100 Programs for the BBC (Prentice Hall)
10 ( ) Coast Book of Games for the Dragon (Fontana)

(Figures compiled by Boots/Websters)

Book Ends

QL Value

Bernard Babani Books have produced one of the best books on the QL. The company specialises in small pocket books that retail for a mere £1.95 *An Introduction to Programming the Sinclair QL* is only 99 pages long, but contains more useful information than almost any of the other glossy books retailing for considerably more.

To be fair to the other books, they aim for an audience which is fresh to computers and consequently spend a lot of time on what lead goes where. But actual experience tends to suggest that the current crop of QL owners have had a computer before.

This books jumps straight in with variables and arrays, there are number of examples of their use — the section is not difficult but not an idiot guide either. Later sections cover using the Beep command, interfaces, turtle graphics, scrolls, pan and windows.

If you're one of those people who have had a previous computer, then you should have a little computer knowledge and could find this book very useful indeed.

Book *An Introduction to Programming the Sinclair QL*
Price *£1.95*
Micro *QL*
Supplier *Bernard Babani, The Grampians, Shepherds Bush Road, London W6 7NF*

Catch 82

It's a banal comparison to equate the number of pages in a book with its worth, but when a computer book costs £5.95 (computer books being generally overpriced anyway) and has only 82 text pages, I feel it's worth noting.

What there is of *The Commodore 64 Disk Book* is interesting for disc owners. Sections include data storage of various kinds of file, relative, random access and sequential, using the Basic commands and changing the drive device number.

About a third of the book is taken up with appendices of disc commands, error messages and a few programs. As I say, what there is of the book is pretty good.

Book *The Commodore 64 Disk Book*
Price *£5.95*
Micro *Commodore 64*
Supplier *Century Communications, Portland House, 12-13 Greek Street, London W1V 5LE*

This Week

Program	Type	Micro	Price	Supplier
Jupiter Jumpman	Arc	Ace	£5.50	MegaTechnic
Paint N' Run	Arc	Ace	£5.50	MegaTechnic
the Forth	Ut	Ace	£8.50	MegaTechnic
Adventure Quest	Ad	Amstrad	£9.95	Level 9
Colossal Adventure	Ad	Amstrad	£9.95	Level 9
Dungeon Adventure	Ad	Amstrad	£9.95	Level 9
Snowball	Ad	Amstrad	£9.95	Level 9
Galaxia	Arc	Amstrad	£5.95	Kuma
Forecaster	Ut	BBC	£15.00	Triptych
Bats Off	Arc	Commodore 64	£5.95	Electric
Havoc	Arc	Commodore 64	£6.95	Dynavision
High Noon	Arc	Commodore 64	£7.90	Ocean
Kokotoni Wilf	Arc	Commodore 64	£6.95	Elite
Minipedes	Arc	Commodore 64	£5.95	Anirog
Tom Thumb	Arc	Commodore 64	£5.95	Anirog
Death Valley	Arc	Dragon 32	£8.50	Micro Data
The Canal Game	Arc	Dragon 32	£5.90	Unique
Screen Copier	Ut	Dragon 32	£3.00	Unique
Bel Base	Ut	Electron	£16.50	Bel Tech
Mail Shot	Ut	Electron	£5.90	Bel Tech
Base Off	Arc	MSX	£8.95	Electric
The Final Mission	Ad	Spectrum	£6.95	Incentive
The Key to Time	Ad	Spectrum	£5.95	Lumpsoft
The Legacy	Ad	Spectrum	£6.95	Tansoft
The Mask of Idon	Ad	Spectrum	£9.95	Artic
Kokotoni Wilf	Arc	Spectrum	£5.95	Elite
Psytraxx	Arc	Spectrum	£7.95	The Edge
Numbers at Work	Ed	Spectrum	£15.50	Triptych
Hustler	S	Spectrum	£6.99	Bubble Bus
Decision Maker	Ut	Spectrum	£15.00	Triptych
Star Seeker	Ut	Spectrum	£15.00	Triptych
Tiny Code	Ut	Spectrum	£5.90	Amazing Games

Key: Ad — adventure/Arc — arcade/Ed — educational
S — strategy-simulation/Ut — utility

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to This Week, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 3LD

ARSONIST

Pyromania is the latest of Automata's arcade games and it reveals the dark side to the Piman's nature — well a light side really since he keeps setting things aflame.

The Piman it would seem is an arsonist.

In the game you are the weary member of the fire brigade whose task it is to extinguish the fires the little pink devil has started on the various floors of Automata Towers. The main idea is to fill a bucket with water from a tap at the bottom of the screen and climb to the various levels where fires rage and put them out. You fight not only time but stray dynamite, blocked escape routes and sundry other obstacles.

The entire conflagration is topped off with a pink elephant dancing on the room and dousing the flames with his trunk. Graphics are small but detailed — good fun.

Program *Pyromania*
Price *£6*
Micro *Spectrum*
Supplier *Automata*
27 Highland Road
Portsmouth
Hants PO4 9DA

PASSWORD

System 15000 is an absolutely wonderful idea for a program that does not appear to have been considered before — artificial hacking!

Hacking has a wonderful appeal, beating the system and all that, man against machine, but the real thing has several big problems associated with it. The first is the enormous telephone expense for all that time spent on the modem, the second, is the CIA and FBI who will almost certainly arrest you if you screw up.

System 15000 closely mimics a vast number of different databases — and you have to hack your way around discovering passwords, etc. Your objective is to find and return $1,500,000 to it's rightful place.

Getting about in the artificial system is as difficult and rewarding as any adventure game and a lot of thought has gone into developing the game — the Commodore version even has authentic phone rings which change when you ring abroad. The Spectrum beeper does its best, too. Something different for adventure fans to try and a must for hackers everywhere. Versions also for Spectrum and BBC.

Program *System 15,000*
Price *£12.95*
Micro *Commodore*
Supplier *Craig Communications*
PO Box 46
Basingstoke
Hants RG21 1HK

MORAL POINT

Who dares wins could easily be the motto for software houses this summer, but let us not forget it is also the proud battlecry of none other than the SAS.

In *SAS Commander* from Comsoft you get to play a member of this elite corps that defends our liberty. The idea of the game is to clear the streets of terrorists without killing the hostages. Neat idea, huh!

There are three streets to clear, each containing 10 terrorists. Two of the terrorists are protected by the hostages. You have to wait awhile before offing them, wait, in fact, for the hostages to turn into terrorists. I think it's clear that Comsoft are making a deep moral point here — aren't we all terrorists in someone's eyes, human nature is capable of many different points of view — freedom fighter or terrorist — who can say?

The graphics are goodish, for a BBC, and the game is well programmed, but is it just me who finds it all a bit dubious?

Program *SAS Commander*
Price *£4.95*
Micro *BBC*
Supplier *Comsoft*
7 Roman Drive
Leeds West
Yorkshire LS8 2DR

LOST PLANET

Praised be the Quill. An outpouring of well-constructed adventures from people who would otherwise not have the programming skills to write them. *Rogue Ship* is a Quilled adventure which will, apparently, form the first part of a trilogy called *Earthquest* about the search for the lost planet earth.

The author stresses that it is a deliberate attempt to get away from adventure game cliches and provide something genuinely different — he appears confident enough to charge £7.95 for it — well over the going rate.

It is different – instead of a help command, you consult Inman a symbiotic being who lives in your body and occasionally makes helpful, unhelpful or irrelevant comments at timely, untimely and irrelevant moments. It's also incredibly devious, much furious note taking and map making is required. Another nice touch is the use of different screen colours to distinguish the various sections of information.

Rogue Ship has much to recommend it – cleverly constructed, apparently lacking in spelling mistakes, witty(ish). I really only have

Pick of the week

GHOSTLY SERVANT

The attempt to combine adventuring with moving graphics in a totally satisfying way goes on with *Avalon* from Hewson Consultants — best known for their *Air Traffic Controller* program.

Avalon is a high resolution, 3D multi-screen game where all commands can be expressed by up, down, left, right. Despite this, Hewson claim that its complexity should attract adventurers as well as the fans of *Atic Atac*.

In fact, *Atic Atac* is the obvious comparison here, *Avalon* looks and plays rather like it but with a number of differences — advances maybe.

You control a Wizard as he moves through a number of different rooms collecting spells and seeking the way down to the eighth level where the lord of Chaos lives. The spells are not merely a euphemism for thunderbolts or lasers; there are a number of different types which have different functions, some zap, but others may give you a ghostly servant to do your bidding or make you invisible.

The graphics are superb, not only smooth scrolling sprites but 3D at that. The effect is pretty spectacular and is only partly spoiled by the Spectrum's dreadful attribute problems.

The plot, graphics and complexity should ensure that this one runs and runs — a must for Christmas.

Program *Avalon*
Price *£7.95*
Micro *Spectrum*
Supplier *Hewson Consultants*
7 Grahame Close
Blewbury
Oxon 11 9QE

two complaints, firstly why spaceships, lasers, robots, etc, why not make the plot really original, too Secondly, £7 95 is a bit steep.

Program *Rogue Ship*
Price *£7.95*
Micro *Spectrum*
Supplier *Alan Pywell, 3 Cleve Avenue, Matlock, Derbys DE4 3BD*

SILLY PLOT

I wonder how much extra the Spectrum would have cost for it to have enough hardware not to have colour attribute problems and decent sound — £20?

The point is those two facilities are all that keeps some of the most recently released Spectrum games from being amazing A case in point being *Pyjamarama* from Mikro-Gen.

Continuing in the Wally series, this is a multi screen cartoon quality epic with big colourful sprites and a silly plot. If only things didn't just keep on changing colour as they pass each other Anyway, back to the game

The format is very *Jet Set Willy*(ish), you have to wander around your home and find a clock. The reason for this is that you are asleep and want to wake up. No ordinary house, you find it is chock full of bouncing, zapping and jumping things; there are things to collect, some of which are vital for the continuance of the game like keys to doors

Pyjamarama is like *Jet Set Willy*, but it has bigger graphics, but lacks some of the fiendishness in the layout of the obstacles. If the colours didn't clash you really could think you were watching a cartoon.

Program *Pyjamarama*
Price *£6.95*
Micro *Spectrum*
Supplier *Mikro-Gen, 44 The Broadway, Bracknell, Berks*

ZOMBIES

For a while Mastertronic have been threatening to release a game at £1 99 that would compete with and even surpass those at full price. With *Chiller* they have done it.

Chiller is a multi (five) screen game which has a plot loosely based on a well-known 15 minute video not beloved of Jehovah s Witnesses The game structure is definitely in the *Manic Miner* school, on each screen you have to grab a number of crosses whilst dodging packs of roving zombies and other nasty things.

To get to the crosses you have to guide a little figure that looks suspiciously like a well known, soft spoken, pop personality Using the common left right jump, he must be made to climb ropes, leap over things swing from branch to branch in the trees and so on. The idea is to jump and leap your way through the screens to find your girlfriend (knuckles rapped, Mastertronic, what about women who want to play this game?) who is held captive in a mansion and rescue her

Not only is it fast, furious and addictive, but the Commodore even manages some attempt at an impersonation of the appropriate music. We were certainly boogying away happily in the office I can tell you. *Chiller* is in short, excellent value At £1 99 it puts many games at £7 00 or £8 00 to shame My only worry is what appears to be a vast number of copyright infringements that must surely have American lawyers hotfooting it to the courts Better buy your copy quickly before the writs hit the fan

Program *Chiller*
Price *£1 99*
Micro *Commodore 64*
Supplier *Mastertronic, Park Lorne, 111 Park Road, London NW8 7JL*

WILD WEST

High Noon is a return to the simplest of all arcade concepts — kill things without being killed. Here, complete with a musical tribute to High Noon, is that theme in the original, the wild west

There isn't really much to the game beyond shooting at baddies who shoot back. To be generous though, there are a good number of extra touches — like the undertaker who wanders out and drags off the dead for measurement Later screens have the baddies on horseback and lobbing dynamite around. Not earth shattering, but fun.

Program *High Noon*
Price *£7.90*
Micro *Commodore 64*
Supplier *Ocean, 6 Central Street, Manchester M2 5NS*

ROAD SIGNS

There's no doubt about it, at the moment the Spectrum has by far the most interesting and widest ranging software. Not only is it first with the brave new concepts like *Deus Ex Machina*, but it knocks other machines for six with unusual but useful oddities like *The Highway Code*

The idea of the program is to supplement the highway code book and provide tests and examples on all the road signs and traffic light sequences, etc.

The program is no Basic-written throwaway either, there are machine code graphics routines to give the whole thing a very slick look.

Program *The Highway Code*
Price *£6.95*
Micro *Spectrum*
Supplier *Datek Computing, 11 Warwick Court, Princess Drive, Harrow, Middlesex, HA1 4UB*

POT BLACK

There have been a number of pool/snooker programs for the Spectrum, but *Hustler* must be one of the best.

The cursor keys or a joystick can be used to position the cursor and a gauge at the bottom of the screen lets you choose the power of your shot. In the Spectrum version you can also control spin-top, bottom, left or right with a choice of two strengths

Apart from that you can play against the machine or another player and there are six different games all based around the general concept of pool. It plays well, and if you want, and haven't yet got, a pool program this is the one to buy

Program *Hustler*
Price *£6.99*
Micro *Spectrum*
Supplier *Bubble Bus, 87 High Street, Tonbridge, Kent TN9 1RX*

Compiled by Graham Taylor

New Releases is designed to let people know what software is coming on the market. If you have a new game or utility which you are about to release send a copy and accompanying details to New Releases, *Popular Computing Weekly* 12-13 Little Newport Street London WC2R 3LD

Smell, touch . . .

Contrary to popular belief there are more important uses for a micro than playing video games! More important too than manipulation of data for uses such as small scale stock control and accounting

The true value of a micro only becomes apparent when it is interfaced to the real world

Imagine, if you will, your brain in a box separate from your body and being kept alive by sophisticated medical equipment. Your only connection with the world is by means of a clever device enabling you to read and write What would life be like? Yes, you can think and, in a crude way, you can communicate but you can't smell, hear, speak, touch, taste or move

As it would be for the human brain so it is for the humble microcomputer

So what can be done to improve the lot of your poor micro?

Probably the simplest way of extending its influence is by means of digital to analogue (D/A) and analogue to digital (A/D) converters These devices allow transferance of data between the digital codes unique to computers and the analogue signals (voltage, length, pitch, speed etc) found in nature A D/A converted linked to a micro via its parallel port gives a voltage output corresponding to a binary code fed into it. This voltage may then be changed, by appropriate electronics, into any analogue form required. The A/D performs the inverse operation, taking a analogue signal by suitable electronics) and voltage (provided once again from any converting it into a binary code recognisable by the computer These two devices allow control of the monitoring of anything from Scalextric to items around the home and garden.

Most of the above suggestions could probably be classified as 'movement' and 'touch' What about the other microcomputer 'senses'? Many companies now offer plug-in boards enabling your micro to speak. These voice synthesis boards are usually self-contained, using none of the micros' memory and requiring the minimum of programming to run them. Although the cheaper ones found on home micros still sound as if they have laryngitis, new devices now have produced have highly realistic voices—it is only a question of time before the prices come down. However the ability to *speak* English but not to *understand* it is like owning a Lambourgini and not being able to drive!

Unfortunately voice recognition units are not nearly as well developed as voice synthesis devices. Where they are available they are usually only for very expensive systems and even then are extremely limited in vocabulary and restricted to one user Developement, though, is progressing rapidly and prices for the best units are dropping fast. New work into increasing semiconductor density on VLSI (very large-scale integration) chips at the University of Oxford and others will bring these devices into the home computer price bracket within five years

Finally, the most complex of all senses, sight Devices can now be found (mostly in the States) allowing a video camera picture to be stored in a micro memory and displayed on its screen. Unfortunately, this does not constitute sight. Sight is the interpretation and understanding of a picture which involves pattern recognition work at the forefront of computer technology It is easily the most difficult problem yet tackled, but considering that 25 years ago voice synthesis and 15 years ago voice recognition, were viewed in the same light, the chances are that microcomputer sight will yet become a reality

Glen Counsell

Side-show

Puzzle No 125

I was asked to devise a 'mathematical' side show at our carnival this summer

Each player would have five ordinary dice which would be thrown on to the table Then the *product* of the five numbers showing would be divided by the sum of those numbers. If the result was a whole number the player would win, if not, he would lose.

Thus if a 1,2,3 4 and 5 were thrown, the product (120) divided by the sum (15) would equal 8, so this would win.

However, in order to calculate the value of prizes for winning it was necessary to calculate the odds involved What are they?

Solution to Puzzle No 120

As we are told that the first bill cost half of the money in the till plus half a pound, there must have been an odd number of pounds at the start so that the addition of the half a pound will result in a whole number of pounds

The program tests successive odd numbers in turn, rejecting those that produce non integral results in the divisions, or those that result in a total that is not a multiple of 13.

```
10 POUNDS = 3 20 AMT = POUNDS 30 FOR N = 2 TO 5
40 AMT = AMT - (AMT/N + 1/N) 50 AMT = VAL (STR$
(AMT)) 60 IF AMT <> INT(AMT) THEN GOTO 120 70
NEXT N 80 AMT = AMT/13 90 IF AMT <> INT(AMT)
THEN GOTO 120 100 PRINT "ORIGINAL AMOUNT IN
TILL WAS";POUNDS;"POUNDS" 110 END 120 POUNDS
= POUNDS + 2 130 GOTO 20
```

This results in an initial sum of £719 from which bills of £360, £120 £60 and £36 were paid. This left a total of £143 which can be exactly divided by 13 the total cost of the mishaps being £576

This is the lowest amount possible Other solutions possible come out as £576 + £624*N where N is a positive integer Gold star and bar for those that spotted this.

Winner of Puzzle No 120

The winner is D Stanford, Sutherland Drive, Kwross Tayside, who receives £10

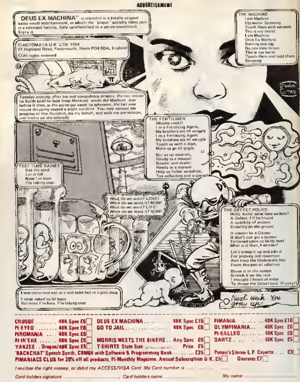
Rules

The closing date for entries to Puzzle No 125 is October 5.

The Hackers



THE HUNCH IS BACK
Your favourite bell ringer, the all-conquering Quasimodo, leaps back into action on another breathtaking epic with Esmerelda! Another superb Ocean extravanganza!
HUNCHBACK II
QUASIMODO'S REVENGE
SPECTRUM 48k
6-90
COMMODORE 64
7-90
ocean
Rumbelows


DEUS EX MACHINA™ is intended as a totally original audio visual entertainment, in which the "player" actively takes part in a televised fantasy, fully synchronised to a stereo soundtrack Enjoy it
©AUTOMATA U.K LTD 1984
27 Highland Road, Portsmouth, Hants PO4 9DA, England
© All rights reserved
THE MACHINE
I am Machine
Egg warm Spinning
Touch them with warmth
This is our secret
I am Machine
Deus Ex Machina
Stealing one egg
No one may notice
This is our secret
Touch them and hold them
Spinning
Tuesday evening, after tea and compulsory prayers the last mouse on Earth tried to hide from Mankind inside the Machine Just before it died, as the nerve-gas eased its sphincter, the last ever mouse dropping caused a slight accident You may control the progress of this Accident, on my behalf, and with my permission, and lead it up the telepath
THE FERTILISER
Wocha cock!!
I'm a Fertilising Agent,
My brothers are all wriggly
I'm a Fertilising Agent
My brothers are all wriggly
Touch us with a digit,
Make us go all giggly
Stir us up tavarich,
Handy as a manuel
Sinister and dexter
Handy as a manual
Help us father woodlice,
Tax collectors and a spaniel
TEST TUBE BABIES
Cut the cord
Let it fall
Now I'm here
I'm taking over
What do we want? LOVE!
When do we want it? NOW!
What do we want? LIFE!
When do we want it? NOW!
THE DEFECT POLICE
Hello hello what have we here?
A Defect I'll be bound
A quantity of protein
Crawling on the ground
It cannot be a Citizen
It don't not got a number
Tattooed upon its baldy head
What is it then, I wonder?
Let's scoop it up and take it
For probing and dissection
And keep the Underlevels free
From this part of infection
Shove it in the muncer
Stretch it on the rack
I thought I heard an order
To throw the Defect back (Funny!)
I was conceived not in a test tube but in a pint mug
I never asked to be born
But since I'm here I'm taking over
Next week You grow up!